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November 13, 1998

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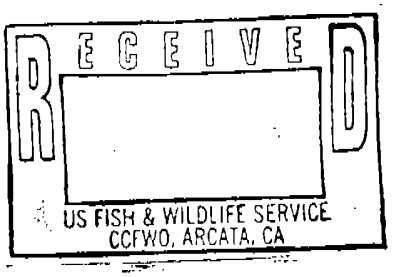

Mr. Bruce Halstead
U.S. Fish & Wildlife Service
1125 16th St., Room 209
Arcata, CA 95521-5582

Dear Mr. Halstead, Mr. Munn, and Mr. Robertson:

These are my comments on the Habitat Conservation Plan/Sustained Yield Plan of the Pacific Lumber Company, on the Draft Environmental Impact Statement/Environmental Impact Report for the "Headwaters Forest Acquisition and the PALCO Sustained Yield Plan and Habitat Conservation Plan", on the Implementation Agreement, and possibly other related documents. I am filing these comments on behalf of the Environmental Protection Information Center, the Sierra Club, and similarly inclined groups and individuals.

The following abbreviations may well be used in this paper: BLM=Bureau of Land Management; CDF=California Department of Forestry; DEIS/EIR=Draft Environmental Impact Statement/Environmental Impact Report; DFG=CA Dept. of Fish and Game; EIS/EIR=Environmental Impact Statement/Environmental Impact Report; ERTC=Elk River Timber Company; ESA=Endangered Species Act; FWS=U.S. Fish & Wildlife Service; HCP=Habitat Conservation Plan; HRSP=Humboldt Redwoods State Park; IA=Implementation Agreement; ITP=Incidental Take Permit; LSH=late seral habitat; MM=marbled murrelet; MMCA=Marbled Murrelet Conservation Area; MMCZ=Marbled Murrelet Conservation Zone; MMRT=Marbled Murrelet Recovery Team; NMFS=National Marine Fisheries Service; NSO=Northern Spotted Owl; PALCO=Pacific Lumber Company and its subsidiaries (in quotes from documents in this comment); PL=Pacific Lumber Company and its subsidiaries; RMZ=Riparian Management Zone; RNP=Redwood National Park; RP=Recovery Plan for the Marbled Murrelet; SCP=Spill Contingency Plan; SRNF=Six Rivers National Forest; SYP=Sustained Yield Plan; WAA=Watershed Assessment Areas; and CA=California, OR=Oregon, & WA=Washington, and Alt.=Alternative. ATT.=Attachment

Let's get right into some key points regarding the sad state of the Marbled Murrelet population in California and how they will continue going downhill under PL's HCP/SYP and Alt. 2 of the DEIS/EIR:

- need well-distributed MM population in Northern CA for a successful recovery of the species
- planned logging (and related activities) under the HCP/SYP would destroy a lot of occupied and suitable MM habitat, while decreasing the range for the MM in the Southern Humboldt Bioregion for nesting, social activity, and flyways – thus decreasing genetic exchange; the planned activities have serious implications not only in Zone 4 but for MMCZ 5 and even MMCZ 6.
- need good north-south and east-west distribution for survival and recovery of MMs; 3.1.1.2 of the RP's page 145 is entitled, "Maintain potential and suitable habitat in larger contiguous blocks while maintaining current north/south and east/west distribution of nesting habitats" while 3.2.2.1 is to "Improve and develop north/south distribution of nesting habitat", while 3.2.2.2 is to "Improve and develop east/west distribution of nesting habitat." (This latter portion says, "opportunities exist on the Olympic Peninsula, Puget trough, and along virtually the entire CA coast within the murrelet's range to improve the current east/west distribution of habitat." Page 146 goes on to call for "complete identification of the inland boundary of suitable nesting habitat for the three-state area.")
- there has never been surveying of PL lands in a uniform way to determine numbers and distribution of MMs on its holdings, but only surveying of certain stands as a prelude to logging a Timber Harvest Plan
- yet there is considerably more knowledge about the MM on PL lands than about the MM in HRSP; the DEIS/EIR says on page 3.10-47, "The quality of old-growth redwood stands for MMs in HRSP is less certain than for the PALCO ownership."

- if indeed HRSP is good habitat for the murrelet (as PL has insisted in recent years), then we certainly need info. about common flyways that MMs use when travelling between their marine feeding areas and their forest nesting sites (which are claimed to be mostly in the Bull Creek and Eel River areas of HRSP)
- the HCP says that most MMs in the Southern Humboldt Bioregion fly to their inland forest sites from the Humboldt Bay area (Page 25 of the HCP Vol. IV Part B Section 1 says, "Since the majority of murrelets in the bioregion appear to fly to inland habitat from the area of Humboldt Bay, the MMCAs are positioned in a manner which is likely to facilitate access to nesting habitat, and social interaction.")
- surveys have detected very few murrelets in the marine foraging area offshore from the Bear River/Cape Mendocino/Mattole River/Lost Coast/King Range area, perhaps largely due to intense weather conditions in that most western portion of the USA (excluding Alaska and Hawaii)
- the Eel River takes a northwesterly course between the HRSP area and the Scotia area
- one notes on page 3.10-33 of the DEIS/EIR that there are some late seral patches between the north/northwest area of HRSP (near Bull Creek) and the Pepperwood and Stafford areas to the north, as well as further down the Eel on either side of Hwy. 101 and the Eel River in the general Scotia area
- predators of the MM are often abundant near the Eel River due to the "edge" associated with the fairly wide river channel and nearby Hwy. 101 as well as the human activity (including their food and vehicular road kill) which attracts corvids
- though a few MMs likely fly to the Mendocino coast or more or less west to the Lost Coast to feed, apparently most MMs in HRSP and in the bioregion feed in the general area of southern Humboldt Bay and the nearby Pacific Ocean and Eel River Delta
- survival of MM adults and chicks can be threatened in years of low prey abundance by the energy expended due to the distance between nesting areas and foraging areas (Burkett 1995) as well as spending longer hours seeking prey for themselves and to take back to the nest—the paragraph in the RP discussing this will be pasted directly below

> Even if adult marbled murrelets can easily choose alternate prey species for their own diet, having abundant forage fish available during the nestling period may significantly reduce the energy demand on the adults by requiring less foraging time and fewer trips inland for feeding nestlings (Cody 1973, Sealy 1975, Carter 1984, Carter and Sealy 1990). The distance between nesting areas and foraging areas is probably one critical determinant of reproductive success in years of low prey abundance. Increased foraging time of adults, long flights inland, and more numerous trips inland with small prey items could potentially reduce both adult and chick survival (Burkett 1995).

- murrelets who fly from HRSP to southern Humboldt Bay for feeding already are flying considerably farther than those who inhabit even the eastern stands of the greater Headwaters Forest area, and if the late seral patches were logged in the Scotia vicinity and especially in the area between the Stafford and Pepperwood area and the north/northwestern portion of HRSP in the Bull Creek area, MMs would have little alternative but to fly down the crowded Eel River valley too far to the east and then fly west to their nesting areas near Bull Creek
- 2 of the 3 main gaps in MM population in WA, OR, and CA begin at or fairly near PL lands: the northern Humboldt Bay through Patrick's Point gap begins by PL's northern boundary (near where PL proposes significant road-building, logging, and herbicide spraying in the next few years in the Freshwater Creek watershed which would exacerbate that gap), while another gap comprises the majority of the Mendocino Zone (MMCZ 5) and the northern part of the Santa Cruz Mtns. Zone (MMCZ 6) and the gap begins not too far south of the southern portion of PL's holdings
- HABITAT CONNECTIVITY is especially poor in 4 portions of PL land; these are: 1) the northeast portion of the Humboldt Bay WAA; 2) the central part of PL land which is in the Van Duzen WAA; 3) the Eel River WAA along the northeast side of Hwy. 101; 4) the Bear-Mattole WAA—this is according to page 3.10-32 of the DEIS/EIR
- page 13 of Bruce Campbell's Scoping Comments (dated 2-14-97) called for (in capital letters no less) "THE EIS/EIR MUST ADDRESS THE IMPORTANCE OF PL LANDS FOR THE WILDLIFE OF NORTHWESTERN CALIFORNIA. It is vital to place PL lands within the greater northwestern CA biological flow, basically the significance of PL lands as far as wildlife corridors and bird flyways to and from various other key wild areas in NW CA." Page 14 of my comments listed 11 key wild areas (or what seem like sensible corridors to connect habitat). The following sentence will omit a portion

BC-1

BC-2

in parentheses and will change what was accidentally typed as "years" to the intended word "areas": "Not only should corridors and flyways be considered between these greater areas, but the integrity of forest cover corridors and flyways within these 11 areas need to be carefully studied too." The only response that I have seen in the DEIS/EIR mentions 4 areas of PL land where habitat connectivity is especially poor, the listing of 3 barriers to dispersal on PL lands (Hwy. 101, the gap in riparian connectivity due to ridges between the Yager and Van Duzen WAAs), and stating where there are 2 notable networks of LSH patches on PL land which act as corridors for some species.

- while noting limitations due to the aforementioned dispersal barriers, page 3.10-34 of the DEIS/EIR says that "two notable networks of LSH patches in and/or near the Project Area may currently provide important wildlife movement/dispersal corridors based on their proximity (less than 0.25 mile apart). These areas include (1) a network of mostly medium-size patches of LSH distributed from the northern portion of the Humboldt WAA through the large-size Headwaters Forest south to the Eel WAA in the northern one-third of the Project Area (i.e., 'the Humboldt-Eel Corridor'); and (2) a network of mostly medium-size patches of LSH in the Eel WAA linking to LSH in HRSP in the southeastern one-third of the Project Area (i.e. the 'Eel-Park Corridor')(Figure 3.9-1). The Eel-Park Corridor may also provide an important link from the eastern side of Hwy. 101 to the western side of Hwy. 101 into the Park. These networks in combination with RMZs may facilitate movement of LSH associates such as fishers and martens to and from refugia in the park and/or patches of LSH in the Project Area."
- referring to what I believe to be inadequate mitigations under the Proposed Action (Alt. 2), page 3.10-113 of the DEIS/EIR says that, "Potential benefits, however, would be limited because selective harvest would be allowed within a portion of Class I and II RMZs, and harvest would be permitted up to the edge of Class III streams. CONNECTIVITY of LSH in the HUMBOLDT-EEL and EEL-PARK CORRIDORS would SUBSTANTIALLY DECREASE through the LONG-TERM due to HARVEST of LSH PREDOMINANTLY in the SHORT TERM (Figure 3.10-7)."

BC-2 CON.

Distinct Murrelet Species in its "Listed" Habitat Segment

I will get back into paragraph form here (still in regards to the MM), and I will resume shorter points in this discussion when I discuss why PL's plans and mitigations do not suffice to recover the MM and could even be a step toward its extinction in the U.S. south of Alaska.

In order to avoid a possible claim by Maxxam/Pacific Lumber that the Alaska murrelet population is doing fine so don't worry about the murrelets in the general coastal area of CA, OR, and WA, here is a quote from page 1 of the Recovery Plan for the Marbled Murrelet (hereafter "RP"): "The WA, OR, and CA population segment of the MM was federally listed as threatened on September 28, 1992 (U.S. Fish & Wildlife Service 1992a) due to the high rate of nesting habitat loss and fragmentation, and mortality associated with net fisheries and oil spills. The U.S.FWS recognized the MM population in WA, OR, and CA as a distinct vertebrate population segment, which is included in the ESA's definition of a 'species' [16 U.S.C. 1532(6)]." It is also advised by page 152 of the RP that genetic structure of MM populations in different MMCZs be studied to discover genetic differences and interchange.

Federal Land as the Backbone for MM Recovery is Insufficient in CA

Next, it is a repeated claim about how federal lands are the "backbone" for the recovery efforts relating to the MM—and this is generally true in WA and OR. To be able to successfully nest in CA, MMs seem to require ancient redwood canopy above their nesting tree and do not nest anywhere near as far inland as do MMs in OR and WA--largely because coast redwoods do not go too far inland from the Pacific Ocean. Page 39 of the RP says, "In CA, Miller & Ralph (1995) found that density of old-growth cover and the presence of coastal redwood were the strongest predictors of MM presence." Page 32 of the RP says, "The furthest inland nests in OR and CA were 40 kilometers (25 miles) and 28.9 kilometers (18 miles) from the ocean, respectively." The HCP/SYP Vol. IV Part B Section 1 says, "some evidence that MMs preferentially nest closer to the ocean." The RP says on page 44 that, "The earliest logging was concentrated at lower elevations and the Coast Ranges (Thomas et al. 1990), generally equating with the range of the MM and in regions generally considered to be the highest quality MM habitat."

Non-Federal Lands are a Key to MM Recovery in CA

The RP page 116 says that while in "some areas, Federal lands provide the bulk of this contribution. In other areas, Federal lands are lacking and non-Federal lands play a necessary role in long-term survival and recovery (FEMAT 1991:IV-165; US Dept. of Agric. & US Dept. of Interior 1994a:3 and 4-249; USF&WS 1994c:46;see also task 2.3)." Even the HCP Vol. IV Part B Section 1 says on page 12, "Although having apparently suitable nesting habitat (mature Douglas-fir with platforms) murrelets are seldom if ever seen in the Six Rivers National Forest, suggesting that the bioregion nesting is essentially restricted to redwoods. On PL lands, murrelets are usually detected only in redwood or mixed redwood/Douglas fir forest stands." Thus I call on the agencies to ignore portions of the HCP (such as the 3rd paragraph on page 18 of previously referenced section) which says how significant federal land is for the murrelet in the region. The claim on page 6 of the HCP (similar section) about the Northwest Forest Plan being a key factor in stabilization of the murrelet population in the bioregion can be dismissed as well.

BC-3

Page 20 of the RP says, "recovery of the MM will require some non-Federal lands, with several important areas occurring on private and state lands." The same document on page 133 says, "Maintenance of MM populations on private lands is critical in arresting the decline of the species in the next 50-100 years. This is especially true where additional nesting habitat is not expected to be available on nearby Federal lands." Page 137 of the RP says, "the demographic bottleneck that the MM population may experience during the next 50-100 years make the maintenance of MM populations not found within Federal lands (mainly on state and private lands) an important component of more guaranteed mobility and eventual recovery over the coming decades and into the future." On page 136, the RP says that, "potential loss of key suitable nesting habitat on non-Federal lands is of major concern for all Zones"—I'd like to emphasize its importance especially in Zones 4 and 6 (with implications for Zone 5 as well). Page 3.10-49 of the DEIS/EIR says, "Recovery actions include maintaining a well-dispersed 3-state population and a viable population within most zones, including Zone 4. Notably, the Marbled Murrelet Recovery Team (MMRT) concluded that, while the murrelet population has a higher likelihood of survival in Zone 4 than in several other zones, the current acreage and quality of existing MM habitat protected in parks in Zone 4 alone is probably inadequate to guarantee the survival of Zone 4 populations in the long-term (FWS, 1997b). Thus, protection of MM habitat on PALCO lands is considered essential by the MMRT for recovery of the MM in Zone 4 (FWS, 1997b)."

Importance of PL Land to the Murrelet

Getting more PL specific, page 3.10-158 of the DEIS/EIR says, "PALCO owns a substantial proportion of remaining old-growth in Humboldt County." Page 133 of the RP says, "(4) Suitable nesting habitat on Pacific Lumber Company lands in HumboldtCounty, CA. These areas are a significant portion of the currently available nesting habitat for the southern part of Zone 4. This area has known nest sites and is situated in a key area, close to the coast, with no Federal lands in the immediate area that are able to provide similar recovery contributions. Maintenance of suitable habitat in this area is also critical to avoid widening the gap between the central CA population and the southern end of Humboldt County."

Importance of Marbled Murrelet Conservation Zones for their Recovery

There are severe problems in some MMCZs in CA. Page 119 of the RP says, "Therefore, when evaluating the potential impacts of land management actions that may affect the MM, the Service will consider whether a significant loss of individual murrelets or habitat in one Conservation Zone—without long term mitigation alleviating the impacts of that loss—would adversely affect the viability of the population in that Zone as well as the long-term viability of populations in other Zones. Excessive impacts to one or more of the Zones could jeopardize the long-term survival and recovery of the murrelet by increasing the risk that catastrophic events might devastate the whole listed species (i.e., the remaining Zonal populations)." Page 119 of the RP also says, "loss of one or more of the murrelet Zone populations will result in an appreciable increase in the risk that the entire listed species may not survive and recover."

Problems with MM Conservation Zones in CA

There are severe problems in some MMCZs in CA. Page 115-116 of the RP says, "the near total historical habitat loss in Zone 5 (Mendocino) may eventually lead to the extirpation of this population no matter what conservation efforts are made. Although conservation measures in this zone could benefit the species and are strongly recommended (see task 1.5), this zone can not be relied on to contribute to the recovery of the species. Zone 6 also appears vulnerable to extirpation due to small population size, habitat

conditions, a lack of Federal land ownership in the area, and isolation from other murrelet populations." Page 129 of the RP says about Zone 5, "The very small nesting and at-sea population of MMs along the coast of Mendocino, Sonoma, and Marin Counties is important to future reconnection of MM populations in northern and central CA, if they can survive over the short term." "Recovery efforts in this Conservation Zone could enhance the probability of survival and recovery in adjacent Conservation Zones by minimizing the current gap in distribution." "if this small population can be maintained over the next 50 years, it will greatly speed recovery in this Conservation Zone."

Decreasing Range of MM Habitat on PL Lands brings more Isolation

I contend that the significant shrinking of suitable (including nesting) habitat for the MM in the southern part of the Southern Humboldt County Bioregion is not only a threat to MM recovery (and possibly even survival depending upon intensity of oil spills and wildfires in the region), but will also have a significant impact on the very struggling Zone 5 (which is called Mendocino but also includes a few murrelets who feed in coastal waters off of Sonoma and Marin Counties). The HCP tells of severe weather conditions in the Lost Coast region, while surveys did not note much MM feeding activity south of the Eel River Delta area. While the majority of MMs in the central and southern portion of PL land and in the Bull Creek area of HRSP may well fly in the general Eel River valley area toward the Eel River Delta/southern Humboldt Bay/& nearby Pacific Ocean area (or make more of a direct flight from Bull Creek toward the lower Eel and the nearby feeding habitat), I believe that some of the murrelets in the far southern portion of Zone 4 fly toward the lovely Mendocino coast possibly due to the bunching of MMs seeking food in or near southern Humboldt Bay and due to severe weather conditions if they fly in the general westerly direction. It is unknown if there is current MM nesting in MMCZ 5. We certainly should not narrow the range of suitable habitat in southern Humboldt and reduce murrelet numbers so that even less explore, stray, or follow their appetite to the southwest to the Mendocino coast. And as a quote in the previous paragraph indicates, Zone 6 already is cut off from the comparatively large north coast population of the MM—plus besides losing a little suitable forest habitat, the threat of oil spills along that busy coast is fairly substantial. Of the three major gaps in the MM population along the listed 3 state segment of the West Coast, the gap covering most of Mendocino County plus the Sonoma and Marin County coasts is a partial barrier to gene flow between MMCZs—unless a MM undertakes a determined long-distance flight and manages to escape predators.

BC-4

It is also interesting to note that PL lands almost run as far south as the Humboldt/Mendocino County line (the dividing line between Zones 4 and 5) and extend to the area east of Humboldt and Arcata Bays, while the other "gap" in MM population in CA runs from central Humboldt Bay to Patrick's Point. To pretend that PL can do lots of short-term logging of occupied and suitable MM habitat on its land (thus narrowing the murrelet's range further) is just not sensible biologically.

Murrelet Population Declines

Before getting into more specifics on PL's logging plans under the Proposed Action, as well as murrelet flyways and their range in the region which includes PL land, let us note population declines in the area. Page 5 of the RP says, "Demographic projections show that MM populations in WA, OR, and CA (Pacific Northwest) are apparently declining at a rapid rate (at least 4 to 7% per year at most locations from 1990-1995)." Page 14 of the HCP Vol. IV B 1 says, "Beissinger (1995) argued that the population of MMs was declining at an annual rate of 4 to 6% throughout the listed range of the species, but that the rate of decline could possibly be twice as large." I note that the HCP/SYP Vol. IV Part B Section 4 Table 3 found that while MM detections increased in two coastal feeding areas in the northern and central portions of Zone 4, yet a 29.87% decline in MM detections was the result of the survey in the Southern Humboldt County Bioregion—the surveys were conducted in 1989 and in 1997. Due to high logging rates of old-growth trees by PL during this time, these results are unfortunately not surprising.

Let Maturing Forests develop into Suitable MM Habitat

If PL was really interested in survival and recovery of the MM, it would certainly not narrow the range of MM forest habitat by clearcutting occupied and suitable MM habitat, but it would be interested in protecting maturing trees which could develop into some decent MM habitat in about a century. Two maturing areas which are in the Humboldt Bay watershed (one of which directly buffers or is at least fairly close to the main Headwaters stand—though a ERTC clearcut borders that stand too) are much of the Elk River Timber Company land in the crucial Elk River watershed—many of these trees are about 90 years

BC-5

old. Another area with fine maturing trees is Freshwater Creek. Unfortunately, PL plans to build a lot of roads in the Freshwater Creek drainage and clearcut and spray it in the very near future. So except for the MMCAs—some of which are lumped together for a little more connectivity yet management activities are allowed and not one of their trees are guaranteed permanent protection, PL is planning on liquidating the most likely replacement habitat which would be especially helpful to really get the MM recovering in the Humboldt Bay region (if they are spared a major oil spill or severe herbicide runoff) as well as to slightly lessen the "gap" in which there are almost no murrelets between central Humboldt Bay and the Patrick's Point State Park area to the north. Another redeeming value, if PL refrains from their plans to butcher what they can of the Elk River and Freshwater Creek watersheds, is that these streams are 2 of the best Coho salmon streams on the North Coast—though both have suffered significantly in the last couple years due to high logging rates, severe erosion and sedimentation impacting both stream channels and nearby residents' homes, and herbicide spraying.

BC-5 CON.

Short Rotation Industrial Forestry is Bad for Murrelets and other Wildlife

Page 101 of the RP says, "Clearcutting of MM habitat and other harvest prescriptions that produce even-aged, mono-typic forest ecosystems produce habitat unsuitable for the MM." Pages 4-5 of the RP says, "In addition, past and current forest management practices also have resulted in a forest age distribution skewed toward younger even-aged stands at a landscape level (Hansen et al. 1991, McComb et al. 1993)." Page 6 says, "the effects of deforestation are chronic and can persist for 100-200 years until forests have regrown to achieve structure that permits MM nesting. If forests were protected from cutting and were able to mature to old-growth characteristics, the number of nesting MMs and their nesting success should increase slowly to levels typical of other alcids." Page 44 of the RP says, "In most cases, second-growth forests have been or are planned to be harvested before they will attain the characteristics of older forests. Thus, this habitat loss is largely permanent, without considerable change in management actions over the next century." Page 131 of the RP says, "Protect terrestrial habitat essential for MM recovery. There appears to be little opportunity for increases in MM productivity as a result of forest maturation in the near future. Even under optimum conditions and with the successful use of various silvicultural techniques, it will take 50 to 100 years or more to develop new suitable nesting habitat within most reserve areas. Any further substantial reduction in occupied nesting habitat for the MM would hamper efforts to stabilize the population recovery of the species."

KNOWN PREDATORS of MURRELETS

Potential nest predators include the common raven (*Corvus corax*), Steller's jay (*Cyanocitta stelleri*), American crow (*Corvus brachyrhynchos*), gray jay (*Perisoreus canadensis*), great horned owl (*Bubo virginianus*), sharp-shinned hawk, Cooper's hawk (*Accipiter cooperii*), northern goshawk, common raccoon (*Procyon lotor*), American marten (*Martes americana*), Townsend chipmunk (*Eutamias townsendii*), northern flying squirrel (*Glaucomys sabrinus*), Douglas squirrel (*Tamiasciurus douglasii*), and fisher (*Martes pennanti*) (Marzluff *et al.* 1996). Ravens, Steller's jays, and possibly great horned owls are known predators of eggs or chicks (Nelson and Hamer 1995b).

RP pg. 51

Pacific Lumber's Spill Contingency Plan (SCP)

Page 10 of the HCP/SYP Summary says, "In the event of a significant spill, PALCO has a contingency plan to respond and control the chemical (see Part P in Volume II)." The last sentence of the first paragraph of the SCP says that, "This contingency plan was primarily written to cover the accidental release of herbicides into the environment, but it serves as a template for any substantial accidental spill." In relation to the two aforementioned sentences: a) Who determines what constitutes a "significant spill" or a "substantial accidental spill", and thus whether the PL contingency plan would go into effect?; b) Is there any sort of quantity or toxicity level which would determine whether a spill would be "significant" or "substantial"—thus triggering the SPC?; and c) Does the SCP for PL and its subsidiaries cover purposeful dumping/spilling (as well as accidental spilling)—such as when a contractor for PL was rinsing out herbicide containers near a creek in the Redway area several years ago? BC-6

I have six more points to raise regarding PL's Spill Contingency Plan:

- All references to "helispots" (1.c.), "aerial units" (3.), and "pilot" (3.) should be eliminated since these strongly suggest aerial spraying of herbicides which not supposed to be permitted (and I guess not applied for) under the HCP/SYP/ITP. BC-7
- Besides the sane biological preference of not allowing herbicides on PL land (and thus there would be no point in mixing and loading the herbicide formulation), if herbicides are to be used, certainly there should be no mixing or loading (or rinsing fairly empty herbicide containers for that matter) in the Riparian Management Zones of Class I or II streams. Also, it is usually steep terrain which forms Class III streams during precipitation events, and herbicide mixing/loading/rinsing must not be allowed in the vicinity of Class III streams either, and there should be a regulation that the ground be fairly flat on which these activities take place. Berming is a good idea wherever these activities do take place, but not using these poisons in the first place is the preferable solution. BC-8
- One can best reduce the possibility of spilled material entering waters and causing harm by not allowing herbicides and herbicide formulations on PL property; likewise no transport of such chemicals is "as little as possible" (mentioned under 1.a.). BC-9
- Under 4.b. "Notification", what determines whether it is "appropriate" for the spill coordinator to notify PL authorities, the Water Quality Control Board, CDFG, the CA Highway Patrol, Humboldt County authorities, and/or Caltrans? BC-10
- Would both Spill Coordinators Dan McLaughlin (Fuel/Oil Spills) and Mark Rodgers (Herbicide Spills) be contacted if there was a spill of a formulation which contained both herbicides and diesel? BC-11
- While it is later qualified by saying "never faster than is safe", 35 miles per hour sounds pretty fast for many of PL's winding logging roads. BC-12

Need I remind the agencies again of my Scoping Comments dated 2-14-97 wherein the first sentence on the last page of my 15 page comment reads (I will type it exactly including capital letters where appropriate). "THE EIS/EIR MUST STUDY EXACTLY WHICH HERBICIDES ARE BEING USED BY THE PL CO. AND EXACTLY WHAT THEIR INGREDIENTS ARE (including INERT ingredients), and study the IMPACTS of ALL THESE INGREDIENTS ON COHO SALMON, SALAMANDERS, TAILED FROGS, MMs, and other creatures of PL land. PLEASE DO SPECIFIC STUDIES IN REGARDS TO DIFFERENCES IN HEALTH AND TOXICITY IF ALL OF THE ELK RIVER WAS IN A RESERVE WITH NO INDUSTRIAL FORESTRY OR HERBICIDE SPRAYING VS. PL's PLANS TO TURN EVERYTHING BUT THE RESERVE AREA INTO CONIFER PLANTATIONS." Later in the paragraph, I stated that there "desperately needs to be studies of the cumulative impact to COHO and other creatures of the ELK RIVER WATERSHED of continued industrial forestry (and related sedimentation and stream temp. increase) and increasing herbicide spraying in areas adjacent to and even surrounded by boundaries of the reserve." BC-13

Let us examine how the agencies who wrote the DEIS/EIR responded to these clear requests/demands. The DEIS/EIR mentioned the active ingredients of the herbicides for which they seek incidental take coverage, even though PL acts like it has phased out (or almost phased out) of atrazine use (due to groundwater contamination concerns) and says that it does not use 2,4-D at this point. Brand name formulations were mentioned, but no ingredients (besides saying that some herbicides are mixed with diesel and besides mentioning an adjuvant) except for active ingredients were mentioned. There was certainly not an attempt to study the impact of the herbicide formulations on certain species of PL land and their greater environment. Despite my request to do so in the aforementioned paragraph, an alternative was not offered

which would protect in a reserve all of the Elk River watershed, while there was no examination of the impact of herbicides (along with sedimentation, temperature, and other problems) on Coho salmon and other creatures.

BC-13 con.

I am hereby incorporating by reference the report called "Toxic Water" by the Northwest Coalition for Alternatives to Pesticides which is about the impacts of pesticides on that species which is supposed to have wildlife agency concern called the Coho salmon. I am currently looking at 2 Domestic Return Receipt postcards proving that I sent this report to the two main federal agencies involved with the HCP and the ITP. On "6-8-98", the report was delivered to the "National Marine Fisheries Service, 501 W. Ocean Bl., Room 4200, Long Beach, CA 90802, attn.: Jim Lecky". Late in the summer, I decided to send the report to the USF&WS as well, in case NMFS did not share the information and/or acted like they did not receive it. On "9-21-98", the report was delivered to "U.S. Fish & Wildlife Service, attn.: Ken Hoffman, 1125 16th St., # 209, Arcata, CA 95521 – this card also mentioned that "('Toxic Water' by NCAP enclosed)".

Giving "Incidental Take coverage" to PL for mass poisoning of the watersheds and species on their land is an absolutely appalling suggestion, and must be decisively rejected. If the herbicides are as non-toxic or short-lived as claimed, then why seek coverage to excuse deaths of "List A" species which might result from the use of these materials?

What info. was included in the DEIS/EIR on herbicides was sketchy at best, while the massive HCP/SYP had less than a page on PL's mass poisoning plans—except for the few page Spill Contingency Plan which I have already critiqued. I noticed that page 3.4-19 of the DEIS/EIR says, "Herbicides have been used for industrial forestry for years in this area, starting in the 1960s." Now what happened in the 1960s? That's right the Vietnam War in which massive amounts of herbicide/defoliants 2,4-D and 2,4,5-T (whose combination was called Agent Orange) was sprayed on jungle in Southeast Asia and is still causing severe problems today. And what herbicides were being pushed by chemical salesmen in forest areas? That's right, 2,4-D and 2,4,5-T – both of which necessarily contain dioxin contaminants. 2,4,5-T was banned temporarily and in an emergency measure for most uses early in 1979, and then was banned entirely a few years later. 2,4-D is still used substantially, though Dow Chemical is pushing their Garlon (triclopyr as the active ingredient) which has a nicer ring to it than a component of the deadly Agent Orange.

The agencies and PL must not get away with sketchy info from selective industry sources. A lot of aspects of triclopyr need to be thoroughly examined and the research clearly presented in the Final EIS/EIR. Concerns about triclopyr which need thorough examination include:

BC-14

- whether dioxin-like compounds can be related to triclopyr (which wouldn't be too surprising since triclopyr is the pyridine analog of the known teratogen, mutagen, and carcinogen 2,4,5-T—differing by just one atom;
- looking into effects from known carcinogens in kerosene (an inert in triclopyr, though not admitted in these documents)
- looking into effects from known carcinogens in diesel oil
- looking into how triclopyr's most common metabolite 3,4,5-TCP is linked to microbial toxicity
- looking into how turbidity in surface water (for instance after roading, clearcutting, and rainstorms) slows triclopyr degradation
- looking into damage to Douglas-fir seedlings from the tric. ester (more intense when mixed with diesel)
- looking into tric.'s severe inhibition of seeds on the forest floor (affecting stand vigor, secondary succession, and biodiversity)
- looking into how tric. reduces nutrient levels in the forest ecosystem, while posing health threats from more nitrates in streams and water sources
- looking into how tric. is the most toxic of 5 tested forest herbicides on mycorrhizal fungi
- looking into toxicity of tric. to fish, with the Garlon 4 ester being especially troubling in this regard
- looking into impact on ground-dwelling aquatic organisms from tric. accumulation in sediments
- looking into Johansen & Geen's study on tric.'s effect on juvenile Coho salmon (including their finding about how sublethal concentrations of tric. alters behavior in Coho, steelhead, & other species
- looking into how tric. persists in vegetation and into what impact this could have on creatures that eat triclopyr-laden vegetation.

Concerns about Glyphosate which must be addressed in the Final EIS/EIR include looking into: BC-15

- the toxic surfactants POEA and Isopropylamine which are in some formulations with glyphosate
- the persistent breakdown product AMPA (whose breakdown ½ life is between 119 and 958 days)
- uncertainties regarding carcinogenicity
- "desorption" relating to glyphosate freeing itself from soil and becoming more mobile
- the persistence of glyphosate in sediments and forest ponds
- the effect of glyphosate-containing formulations on nitrogen fixation, as well as on fish, voles, mice, mycorrhizal fungi, and other species

In addition (or should I say subtraction), studies of glyphosate by 2 labs which have been cited for fraudulent testing must not be considered in your study and conclusions.

2,4-D The Final EIS/EIR must discuss the persistence and bioaccumulation of DIOXINS which are necessarily in 2,4-D, whether they are the deadly 2,3,7,8-TCDD, the ½ as toxic 1,2,3,7,8-PCDD, or other dioxin varieties. I will enclose a sheet as an attachment which features references where one can get additional information about Agent Orange component 2,4-D. BC-16

ATRAZINE I disagree with the conclusion in the DEIS/EIR that Atrazine is not a carcinogen, since lab tests have clearly shown that this herbicide known for its pollution of groundwater in the Corn Belt and elsewhere has been linked to mammary, ovarian, and testicular cancers. In 1994, the EPA undertook a special review of atrazine, simazine, and other "zine" herbicides because of evidence linking these herbicides to breast cancer. BC-17

I unfortunately do not have time to dig up papers on Imazapyr, Hexazinone, and Sulfometuron Methyl to include specific concerns regarding the individual herbicides which need to be discussed in the final document, but I will point out 2 things. Isn't Sulfometuron Methyl the herbicide that spilled from the train wreck into the upper Sacramento River killing everything for dozens of miles? Also, page 3.14-3 of the DEIS/EIR says that hexazinone is not usually used in the coastal part of Humboldt County because redwoods are especially sensitive to this herbicide, but since PL plans a huge conversion from redwood to Douglas-fir plantations, will this herbicide be used to help convert the redwood region into a boring poisoned Douglas-fir tree farm which will be a severe fire hazard and susceptible to disease? BC-18

Extent of Herbicide Use on PL Land

First I want to say that I'm sick of hearing how the "historical rate" of logging is the last 13 years of a greedy corporate raider clearcutting pristine habitat to pay off high interest rates on poor quality bonds. Pacific Lumber was a reputable company for most of the century until 13 years ago. Pacific Lumber never sprayed herbicides until I believe the first year was 1994. BC-19

According to page 3.14-19 of the DEIS/EIR, herbicides are used wherever intensive management takes place on PL land. Page 3.9-30 of that same document says, "The remainder of PALCO lands, approximately 174,386 acres, which would include lands from the Elk River Timber Company, would be intensively managed for timber production."

As far as how extensive herbicide use will be on PL land, the best estimate may be in a paragraph on page 3.14-9 of the DEIS/EIR which says, "Under the proposed SYP, harvest in the first decade would result in 34,720 acres of clear cut. Of this total, 80 percent, or 27,776 acres would be subject to a one- or two-year herbicide treatment program for weed and brush suppression. This would be done with hand applied preemergent or pre- and postemergent mix as is now practiced on the ownership. As described above, PALCO has embarked on a program of hardwood control and rehabilitation of conifer forest. This would continue at the rate of some 2,000 acres per year for the next 10 years for a total additional first decade treatment of 20,000 acres. Reforestation would rely on a combination of oliar, basal, frill, and stump treatment with a postemergent. Thus an annual treatment of some 4,700 acres would occur during the first decade." I examined the above numbers and came out with 47,776 acres in the first decade (not including drift). The DEIS/EIR mentions that PL used herbicides on 4850 acres in 1997. So, it is reasonably clear that PL applies herbicides to a huge amount of acres, but how often a given acre will be sprayed is more nebulous. How much of the 27,776 acres would be sprayed twice? Also, what will happen on the almost 7,000 acres of planned clearcut in the first decade which is not included in the # stated as the planned acreage to get herbicided? (I will not get into a long rap here regarding how long a

decade is, as I did at a Culver City hearing. Briefly, "decade" is from the Greek root "dec" meaning "ten". Since the HCP & ITP are for 50 years, and the SYP for 120 years – and these are all multiples of ten, then even a greedy corporate raider cannot change the dictionary definition to make a decade less than ten years so he can wipe out occupied and suitable MM habitat at an incredibly quick pace. A decade is ten years!).

There are a lot of data gaps regarding herbicides in use, while animal studies are likely more on the basic lab animals rather than animals from wild genetic stock in the increasingly fragmented forest environment. There are a lot of unknowns as to ingredients, breakdown products, impacts on downstream residents, "List A" species, etc. There are a number of direct and indirect effects, some of which are mentioned on page 3.14-10 of the DEIS/EIR. I'd like to quote from pg. 3.14-11 of the DEIS/EIR, "More research is needed on the cumulative effects of forest herbicides to assess the impacts on parameters such as water quality, human health, invertebrates, amphibians, reptiles, wildlife, and biodiversity (Neary et al., 1993). Under Section 7 of the ESA, the EPA is required to consult with the FWS and NMFS on the registration of compounds that are likely to adversely affect listed species and their habitats. The forest herbicides addressed here have not yet undergone consultation, so effects on listed species have not been evaluated. The scarcity of information available on the direct and indirect effects of these compounds on covered species, and the variations in their use, makes it difficult to assess the magnitude of impact likely to occur from use. Complicating the analysis of these compounds is the use of a variety of carriers and surfactants, because toxicity varies greatly based on application rates and carrier." Also pg. 3.14-9 of the DEIS/EIR says that "no numerical standards have been set which incorporate protection for endangered species."

I also want to say that synergistic effects need to be addressed as well. I also wish to point out that "Numerical standards for the protection of terrestrial and aquatic species have not been established for any of the herbicides used by PALCO." Such numerical standards have not been set, not by the Federal Clean Water Act, nor by the North Coast Region Water Quality Control Board under the Porter-Cologne Act.

I am concerned that the meek conclusion of page 3.14-20 of the DEIS/EIR will change into okaying massive herbicide use despite impacts to "List A" and other species due to political pressure from above. There are obviously an array of unknowns and little knowns about the herbicides and formulations themselves, about their ingredients, carriers, and breakdown products, about the habitat needs and food consumed by "List A" species and how direct and indirect effects from herbicides will affect them. This meek statement on pg. 3.14-20 shows lack of spine; it says, "there may be an impact to covered species while the monitoring and review program is perfected. For this reason, the impact of herbicide use on covered species is not considered to be mitigated to insignificance." First of all, no amount of bureaucracy and sampling will lessen impact of herbicides on covered species—let alone untrustworthy sampling done by PL. Second, "not considered to be mitigated to insignificance" is milk-toast at best, and appears to be intended to be able to be easily changed when some higher up says that PL needs poisons under their SYP, so of course these herbicides are not significant to "List A" Species. "Not considered to be mitigated to insignificance" is an understatement rather than an overstatement. And even if there was adequate information about short-term toxicity and impacts on species which List A species eat, since the agencies are supposed to be concerned about longer term survival and even recovery, certainly no one has a clue (especially if they're concluding that there is no problem spraying poisons on the majority of a stream-blessed region) about long-term impacts on unique and genetically wild strains of species which have (at least until PL started spraying in 1994) generally lived in a fairly pristine (though increasingly fragmented) environment for over 50 million years in the case of the tailed frog. I'll put it this way, how often have you heard of a stressed out person seeking a cleansing, rejuvenating experience as a farmworker in heavily sprayed fields of Fresno County?

Also, if PL refuses to follow a court order to provide drinking water for some residents downstream from Pacific Lumber clearcuts, herbicide applications, and eroding hillsides, do you think they will care about providing water years or decades down the line if it is concluded that maybe Coho salmon don't thrive on herbicides after all?

BC-19 CON.

Since the documents admit so much important wildlife habitat on state parkland adjacent to PL property, I call for the acquisition of the 600 feet of PL property which borders these parks (as well as the land bordering the County Park along the Van Duzen River). Places such as the Avenue of Giants (which is already in trouble because it is too narrow to provide much if any interior forest habitat) will be devastatingly isolated by near future PL plans—and it may be in the "Eel-Park Corridor" (the series of patches more or less connecting wildlife habitat) between the southeastern part of PL holdings across the Eel River and Hwy. 101 and into HRSP. The selective harvest which PL proposes as a buffer can be practiced on at least PL's next 300 feet (following the acquisition of the nearest 600 feet of PL property which would be added to the respective parks). You may refer to the advantages of large buffers mentioned on page 3.10-109 in relation to the better buffers which would be a part of Alt. 3. The RP on page 143 points out that "unthinned buffers should be left around any occupied stands." BC-20

Differentiate Late Seral from Old Components, plus a Couple Points on the NSO

While it is interesting to see some maps that lump ancient forest/residual forest/mature forest/40 to 60 year old late seral stands together, there also needs to be a lot of maps and related analysis which differentiate between various components of late seral, since some creatures need ancient forest and interior forest habitat—while certain species need some ancient tree and canopy characteristics. Also, Northern Spotted Owls need better habitat than 40 to 60 year old trees on plantations, and I'd like to mention my objection the Proposed Action's plan to allow logging of supposedly unoccupied owl nests, despite it being fairly common knowledge that it is not unusual for NSOs to return to a former nest despite moving to another area for a few years. BC-21

Owl Creek & the Evolutionary Importance of the Eastern Extent of the Coast Redwood Range

One portion of the HCP criticized Owl Creek as if it was not a significant area. It is the main stand for ancient redwood in the southeastern part of the greater Headwaters Forest region—though it was seriously abused by PL in illegal logging rampages including on Thanksgiving Day 1992. Owl Creek is of higher elevation than most other stands in the area and it is likely the only place in the world with a sizable meadow/prairie featuring native grasses surrounded by ancient coast redwood/Douglas-fir forests. Owl Creek (as well as the Grizzly Creek area to the south/southeast) are the eastern part of the known nesting range for the MM in CA). Since these stands are toward the eastern part of the range for the coast redwood tree, they are of special evolutionary significance. This is why I call for the protection of both the Owl Creek stand and the Grizzly Creek region—the latter would not only include the "optional" Grizzly Creek MMCA, but would also protect the area where David Chain was killed, as well as the Mt. Bemis and Swains Flat area. BC-22

Also, if one was concerned about wildlife habitat connectivity, not only would the DEIS/EIR respond to my scoping concern about seeking to determine the key wildlife corridors onPL property and connecting to wild areas beyond, but you'd consider the Bell-Lawrence/Iaqua Buttes/Pilot Creek area of SRNF as a potentially feasible corridor (would that interfere with PL plans on their land near BLM's Iaqua Buttes?), and should consider how species in the Owl Creek and Grizzly Creek area could get to the upper Van Duzen River to the northern part of South Fork Trinity Mtn. As well as to the south toward the key predominantly Douglas-fir stand but with murrelet detections in upper Larabee Creek.

Fragmentation and Predators

Page 48 of the RP says, "Among all Pacific NW birds, the MM is considered to be one of the most sensitive to forest fragmentation (Hansen & Urban 1992)." In 1994, strong evidence convinced Paton to conclude that avian nest success declines near edges. Page 50 of the RP says, "Preliminary results indicate that proximity to human activity and landscape contiguity may interact to determine rate of predation. Interior forest nests in contiguous stands far from human activity appear to experience the least predation (Marzluff et al. 1996)." Page 10 of the RP points out that, "the major factor in MM decline from historical levels" are "(1) loss of nesting habitat and (2) poor reproductive success in the habitat that does remain, a phenomenon that appears due in large part to increased vulnerability of nests to predators in highly fragmented landscapes." Page 123 of the RP says,"Some other factors that may contribute to or limit population growth need to be explored in more depth, including....nesting habitat requirements and effects of avian predation on nest success." It says on page 3.10-42 in regards to MMCZ 4 that, "Preliminary unconfirmed results of MM surveys suggest that almost no productivity occurred in this bioregion during 1996(FWS. 1996)." "Nesting occurs from March through August, and the nestling period extends through

mid-to late September (Hamer and Nelson, 1995)." 2 pages later, it says, "it is generally assumed that habitat fragmentation can substantially increase the risk of predation on these nests through increased exposure to predators generally associated with edge. Corvid bird species, particularly the Stellar's jay and common raven, are of primary concern with respect to predation on murrelets in the interior coast ranges of NW CA (Ralph et al. 1995; Hunter & Ralph, 1996; Hunter et al. 1997)." Note this next quote about a lot of uncertainties relating to the MM, "Despite a substantial amount of research and survey effort during recent years, a large degree of uncertainty remains regarding the status of MMs and their habitat use in the Project Area and the surrounding region."

I call for each alternative presented in the Final EIS/EIR to undergo an in-depth examination in regards to how forest management plans under the HCP/SYP would impact each and every one of the 14 predators (pasted up from page 51 of the RP and placed on the bottom of page 6 of these comments) who target the murrelt or its eggs/chicks. Please analyze this for the short, mid, and long-term impacts on these predators, with obvious implications for the MM population in Zone 4 (and even to other MMCZs). BC-23

Sincerely,

Bruce Campbell

Bruce Campbell

ATT. 1

TOXIC WATER

A Report on the Adverse Effects of Pesticides on Pacific Coho Salmon and the Prevalence of Pesticides in Coho Habitat

by Norma Grier, Erik Clough and Anna Clewell

December, 1994

Northwest Coalition for Alternatives to Pesticides (NCAP)
PO Box 1393
Eugene, OR 97440
(541) 344-5044

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Credits:

This report was written by the Northwest Coalition for Alternatives to Pesticides (NCAP). The idea for the report was conceived by a working group of primarily Oregon Coast Range residents who have met over the past year to share concerns and strategies for addressing the pervasive problems of pesticide use in forestry. Members from the following organizations have been instrumental in preparing this report: Forest Matters, Lincoln County Watershed Watch, and Oregon Coast Range Association. Invaluable assistance with research and editing came from Jane Helrich, Ray Kinney, Ray Nolan, and William M. Gates.

NCAP is a 17-year old, five state regional membership organization whose mission is to promote sustainable resource management, prevention of pest problems, use of alternatives to pesticides, and the right to be free from pesticide exposure.

NCAP; PO Box 1393; Eugene, OR 97440 (541) 344-5044

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TOXIC WATER
A Report on the Adverse Effects of Pesticides on Pacific Coho Salmon and the Prevalence of Pesticides in Coho Habitat

Northwest public agencies, political and community leaders, and numerous residents are now discussing protection and possible Endangered Species Act listing of the Pacific coho salmon (*Oncorhynchus kisutch*). While many organizations and individuals have contributed needed information to this important discussion, none has focused on the potential toxic effects of pesticides on coho in the region's water. *Toxic Water* (a) documents these issues, (b) explains what is known and not known about pesticide residues in the region's surface waters, and (c) makes recommendations regarding these topics for coho protection and restoration.

The issue of pesticides in water must be included in plans to restore indigenous coho salmon populations. In the past two years, a number of reports and Endangered Species Act petitions specific to the Pacific coho have been prepared for the National Marine Fisheries Service (NMFS) and others. These documents have identified several causal conditions contributing to coho population decline and extinctions, including loss and fragmentation of historic population ranges, failure of artificial propagation techniques to restore locally depleted coho runs, deterioration of freshwater habitat, deterioration of ocean water habitat and marine food webs, overfishing, interspecific hybridization, and inadequacy of existing regulatory mechanisms.

Toxic Water is written to document the adverse effects of pesticides and show how commonly pesticide residues are detected throughout Pacific coho habitat. Much of the evidence for concern that is presented in *Toxic Water* is drawn from research experiments and monitoring of pesticides used in forestry. However, agricultural and urban and suburban pesticide uses must also be considered because these uses also contaminate watersheds for coho habitat. Additionally, while many of the studies cited in these comments pertain to direct effects on coho, the important effects of pesticides on the flora and fauna that constitute the coho's habitat and food supply deserve detailed attention.

Toxic Water is not an exhaustive treatise on pesticides and coho salmon. Rather, selected studies are used to illustrate key points that deserve attention. The information presented supports the document's recommendations.

I. How Pesticides Affect Fish

Pesticides are biocides designed to kill or otherwise harm living organisms; they include insecticides, fungicides, herbicides, and rodenticides. "Pesticides are perhaps the only toxic substance purposefully applied to the environment," wrote the National Academy of Sciences in a recent report. (National Research Council 1993)

Pesticides affect coho (and other fish species) both directly and indirectly. Fish can be exposed to pesticides in a manner that is acute (short-term) or chronic (over a prolonged period). Pesticide's toxic effects on fish can be acute (having relatively rapid onset of either mild or severe symptoms that result in short-term, long-term or permanent damage) and/or chronic (symptoms or disorders that continue for an extended period of time).

Direct toxic effects can kill fish. Sub-lethal exposure to pesticides can affect fish directly resulting in reduced reproduction and survivability. (Symons 1973, Johansen 1990) Habitat deterioration directly linked to pesticide use can also cause indirect effects resulting in mortality of weakened coho populations.

A. Direct, Lethal Effects of Pesticides

Most pesticides are toxic to aquatic organisms at some level of exposure. Tests using coho salmon and other fish species can determine what amount of exposure to a specific pesticide kills fish. These acute toxicity experimental results are presented as a concentration (e.g., milligrams of pesticide per liter of water, or mg/L) at which half of the experimental fish population dies (LC_{50}, or lethal concentration for 50 percent of the fish).

Results from these types of acute toxicity studies show high inter-study and intra-study variability. For example, acute toxicities of the herbicide Roundup ranged from a LC_{50} of 2.3 mg/L for fathead minnows to a LC_{50} of 13 mg/L for channel catfish. (Folmar 1979) Published LC_{50} values for Roundup on rainbow trout varied by a factor of thirty. (Servizi 1987)

Even the most conservative studies of LC_{50} values may be inappropriate data on which to determine water quality standards which are relevant to endangered coho salmon populations. This is because the lethal concentration that kills the first fish (not the amount that kills half of the fish in the population) is what would be strategic information for endangered species protection.

In proposing water quality criteria for the states of Oregon and Washington, researchers from Oregon State University have used LC_{50} values from various scientific studies and applied safety factors to arrive at surface water concentrations of a particular toxin which are not to be exceeded. In the proposal of these water quality criteria the authors state, "For non-human life forms, protection of populations of organisms rather than the protection of each individual is the usual strategy, except when rare or endangered species are involved." (Norris 1991)

Therefore, when pesticides are used in forest and other settings the highest standards must be applied when considering threatened or endangered species. Regulatory agencies have yet to propose these standards. Under the Endangered Species Act, death due to pesticide poisoning could be considered a "taking."

Age can greatly affect the response of fish to toxic exposures, with juvenile fish often being more susceptible than adults to a pesticide's toxic effects. In one study, juvenile fish were more susceptible to the herbicide Roundup than adult fish. (Folmar 1979) Since coho salmon are born and spend the juvenile stage of life in fresh water, consideration of this increased vulnerability is important.

Some studies are not entirely applicable to coho as they develop in their natural environment. In one study using the herbicide dicamba, no effects on yearling coho salmon were observed at concentrations up to 100 parts per million (ppm). However, yearling coho were killed by much smaller doses as low as 0.25 ppm during a seawater challenge test that simulated their migration from rivers to the ocean. (Lorz 1979)

Different formulations of a pesticide can affect its toxicity. For example, the propylene glycol butyl ether ester formulation of the herbicide 2,4-D was more toxic to experimental fish than a butoxyethanol ester formulation. (Finlayson 1985) Similarly, the ester formulation of triclopyr (Garlon 4) is 167 times more toxic to fish than the amine triclopyr formulation (Garlon 3A). (Norris 1991)

Any analysis of the impact of pesticides on coho populations must include full consideration of both the "inert" ingredients in pesticide products and adjuvants. Pesticide products contain two types of ingredients. "Active" ingredients are identified by name on product labels and are in formulations to perform the intended function of the product (e.g., kill insects, desicate plants). "Inert" ingredients are all other compounds in pesticide products, and they are not necessarily biologically, chemically or toxicologically inert. These ingredients which may not have been tested in any way for toxicity to human or non-human organisms. "Inerts" include solvents, surfactants, emulsifiers, preservatives, and propellants. Generally, "inerts" are not identified by name on product labels, and pesticide manufacturers and formulators consider them to be a trade secret. At times and upon request, manufacturers may publicly disclose the identity of "inerts."

Adjuvants are products intentionally mixed with pesticide products at the time pesticides are prepared for application. Adjuvants perform various functions including retarding pesticide degradation by ultraviolet light or allowing dissimilar pesticides to mix together in a tank. Many of the ingredients in adjuvants are also trade secret.

Most research studies do not consider pesticides as they are actually used in the environment. Usually only the pesticide active ingredient is studied, rather than the full formulation or formulations in combination. Public agency personnel or pesticide users often do not know the identity of all the ingredients in pesticide products and cannot consider the harm that may occur from the use of a certain product.

It is well known that glyphosate, the active ingredient in Roundup and Rodeo, is not the ingredient most toxic to fish that is present in the formulations that are applied in the field. (Wan 1989, Servizi 1987, Mitchell 1987) An adjuvant which was used in conjunction with an herbicide containing dicamba and 2,4-D was responsible for a fish kill in Douglas County, Oregon. (PARC 1991-92)

B. Direct, Sub-Lethal Effects of Pesticides

Coho mortality due to pesticide exposure is a significant concern. However, the sub-lethal effects of the many pesticides applied in watersheds are perhaps more important to the coho's survival as a species. Most likely, these sub-lethal effects are both insidious and widespread.

As the following studies show, sub-lethal exposures of a variety of pesticides have deleterious effects on salmon. While not all these studies were conducted using coho salmon as the experimental animal (trout was the species studied in some instances), there is direct applicability to the current concern for coho.

In one study of juvenile coho, the herbicide triclopyr caused behavioral changes such as reduced predator avoidance and downstream drift. Such sub-lethal effects could threaten survival. This same study noted that, at the recommended application rate of 2.5 kilograms per hectare with an

overspray of side channels, concentrations of this herbicide could cause behavioral changes and lead to mortality. (Johansen 1990)

Another study with juvenile coho found hypersensitive reactions to stimuli and increased respiration. These behavioral effects were noted at concentrations of the triclopyr ester formulation that were less than 0.1 milligrams per liter (mg/L). This concentration is 20 percent of the LC_{50} value. (Janz 1991)

The extensive, and often cited, field study at Carnation Creek, British Columbia found several different effects. In addition to direct mortality of coho salmon due to waterway overspray of Roundup (glyphosate), the coho catch (of food prey) per unit of effort (CPUE) declined after the herbicide application. The study also looked at whether fish were less likely to enter a tributary after it had been sprayed (when compared with data collected for three years pre-spray) and whether fish were more likely to leave the tributary. For two years after the spraying, there was a decline in coho returning to one of the two sprayed tributaries, and this was accompanied by an increase in fish (coho) leaving the tributary. (Holtby 1987)

In a study of sub-lethal toxicity of six pesticides (carbaryl, chlordane, 2,4-D, DEF, methyl parathion, and pentachlorophenol) to rainbow trout (*Oncorhynchus mykiss*), several parameters of behavior were adversely affected and, in most cases, showed a dose-related response. This study found that exposure to the tested pesticides significantly reduced the trout's survival from predation, and behavioral changes were evident within 96-hours of exposure even when contamination concentrations were below EPA-established ambient water quality standards. The study indicated that "carbaryl...impaired fish behavior at concentrations that might be expected to occur in the environment." (Little 1990)

A Canadian study of stress response of sockeye salmon (*Oncorhynchus nerka*) to sub-lethal exposures of the butoxyethyl ester (BEE) of 2,4-D found a clear stress response by the sockeye fry, as indicated by interrenal hypertrophy (kidney dysfunction) at exposure as low as 0.3 mg/L. The study's summary states, "The recommended dose for 2,4-D application (nominal concentration) to control aquatic weeds is 1 to 5 mg/L. Thus, the degree of safety for sockeye exposed to BEE 2,4-D in terms of either concentration of herbicide or duration of exposure appears to be marginal." (McBride 1981)

Another Canadian study says the 96-hour no effect level (survival) for coho salmon fingerlings was less than 1 mg/L for BEE 2,4-D, and a 27 percent fry mortality occurred after this 96-hour exposure. (Meehan 1974)

In a Canadian study, young Atlantic salmon (*Salmo salar*) were exposed to 1 part per million (1 ppm; 1 mg/L) of the insecticide fenitrothion for 15 to 16 hours. The exposure caused a 50 percent decrease in the number holding territories six days after treatment, and territories were not reclaimed for two to three weeks after exposure. At 0.1 ppm, there was a 20 percent decrease in the number holding territories. The same study looked at young salmon forcefed mealworms injected with fenitrothion. Although the fish regurgitated 50 percent of the mealworms after ingesting them, all fish ingesting the mealworms had lowered escape response. (Symons 1973)

A second study with juvenile Altantic salmon (*Salmo salar*) found that very low levels of exposure to fenitrothion affected foraging behavior. Concentrations as low as 0.02 micrograms per liter (ug/L) for the active ingredient (technical grade) and 0.08 ug/L for the fenitrothion

product formulation (operational grade) caused significant decreases in the salmon's attack sequence. Concentrations as low as 0.005 ug/L for technical grade and 0.04 operational fenitrothion produced significant decrease in the salmon's reaction distance to prey. Concentrations of 0.05 technical grade and 0.08 operational fenitrothion decreased the number of ingestions made by the fish. (Morgan 1990)

A third study with fenitrothion found the exposed yearling Altantic salmon (*Salmo salar*) were more vulnerable to predation by large brook trout than unexposed salmon. (Hatfield 1972)

A fourth study with fenitrothion found juvenile coho stopped all behaviors involving locomotion after two hours of exposure at concentrations of 0.04 ppm, and the fish displayed signs of stress. Feeding was depressed at concentrations as low as 0.1 ppm, and the study found decreased feeding persisting even in the presence of large amounts of uncontaminated food. (Bull 1974)

Research on the sublethal effects of pesticides indicates that coho can be harmed at much lower levels of exposure than the concentration levels needed to kill fish.

C. Indirect Effects of Pesticides

The use of pesticides in anadromous fish watersheds raises important questions about subtle adverse effects such exogenous chemicals have on the fish via effects on their aquatic habitat. These indirect effects can seriously weaken coho.

Scant research has been done to look at these kinds of ecosystem effects on organisms, much less on coho. Research done in the Carnation Creek watershed in British Columbia found lack of shade over a stream due to riparian vegetation being killed by herbicides. This increases water temperature which adversely affects coho. (Holtby 1987)

Herbivorous aquatic insect populations can be reduced when herbicides like atrazine kill aquatic vegetation. In one study with concentrations of atrazine at 20 ug/L, the loss of herbivorous aquatic insects ultimately affected both the food supply and reproductive success of bluegill fish that prey on these kinds of aquatic insects for their food source. (Kettle 1987)

In general, scientists are not very good at predicting the ecological effects a pesticide may have. These ecological impacts could harm a species needing protection, like coho. For example, a Minnesota study designed to test for aquatic ecosystem effects measured the effects of the insecticide chlorpyrifos on aquatic organisms. Based on known LC_{50} values for various aquatic organisms, researchers predicted that nine organisms were likely to be affected by a concentration of 0.5 ug/L of chlorpyrifos. In fact, 19 of the 48 species were adversely affected, a much greater percentage of organisms in the ecosystems. (Voshell 1989)

While indirect effects of pesticides have a great potential to harm coho, current scientific knowledge and prediction for these types of effects are so crude that meaningful evaluation may not be possible.

II. Pesticide Residues are Widespread in Coho Habitat

An alarming number of streams in Pacific coho habitat are regularly contaminated with pesticides that are applied using routine practices. The source of contamination originates with both agricultural and non-agricultural applications of pesticides.

In 1989 and 1990, the Oregon Department of Forestry (ODF), evaluated forest streams for herbicide contamination to determine whether its forest practice chemical rules were effective at protecting aquatic habitat. The study included 52 samples, of which 17.3 percent were contaminated. These monitoring samples were all taken within the first 24 hours of herbicide application. (ODF 1992)

Monitoring results from California indicated a much higher percentage of contamination when samples were taken at times beyond the first 24 hours after application. The California North Coast Regional Water Quality Control Board samples surface water to evaluate the extent of contamination that resulted from aerial forest herbicide spraying. This agency took samples both immediately after application and after any significant storm run off within 30 days of the treatment. Its results show how frequently storm run off transported pesticide residues into surface water. Of 165 samples taken in 1991, 26 percent were contaminated with an herbicide. Of the samples taken within 24 hours after application, eight percent were contaminated, while 38 percent were contaminated after the first significant storm run off, an almost five-fold increase. The agency's report states that these results have been consistent over several years. (Greene 1992)

Samples from the Amazon Creek in Eugene, Oregon were taken in September of 1990 to determine the amount of various pollutants, including pesticides, that contaminate the Amazon Basin. According to the study report, 42 percent of the herbicide and insecticide samples were positive. Of the eight samples taken for 2,4-D, six were positive. Of the eight taken for diazinon, five were positive. (Rinella 1993)

A. Regulatory Agencies May Not Know What Pesticides Are Used in Coho Habitat

A major problem is the lack of information about what pesticides are used in the watersheds that comprise the habitat for coho. With the exception of the State of California, not only is there lack of reporting of pesticide use to public agencies, but throughout coho habitat, users are not necessarily required to even keep complete records of the pesticides they use.

The 1990 Farm Bill required all users of pesticides that are classified as "restricted use" (e.g., those likely to contaminate ground water or having high acute toxicity) to keep use records for a three year period. There is no reporting required, only recordkeeping.

The U.S. Department of Agriculture, National Agricultural Statistics Service, Agricultural Statistics Board annually collects on-farm agricultural chemical use information for selected crops in selected states to support the evaluation of water quality and food safety issues. For example, the 1993 field crop survey included pesticide use data for corn, cotton, fall potatoes, soybeans, and winter, durum and spring wheat. The only applicable statistics were those for potatoes and winter wheat. (USDA 1994) USDA's statistics on pesticide use are conducted with quality survey methodology, but they are limited in scope and applicability.

State-generated data on pesticide use information is paltry also. Only the state of California has a comprehensive pesticide use reporting system. In California, the use of all agricultural and commercially-applied pesticides is reported to the county agriculture commissioner. Counties compile this data and report it to the state. Specific information is available statewide by location and by crop for the lion's share of pesticides used. (California Department of Pesticide Regulation 1994)

According to Washington state law, recordkeeping is required of all agricultural pesticide use, but no reporting. Idaho has no state reporting requirements established. Oregon requires commercial applicators to maintain records that are only accessible on demand to the state, but no state reporting is required. Oregon Extension Service has made estimates of pesticide use, the last time in 1987, by surveying extension agents and pesticide dealers. (Rinehold 1989)

The federal government has inventoried 35 commonly-applied agricultural pesticides to assess use patterns in coastal zones of the United States. According to the government, almost 60,000 pounds of the insecticide carbaryl were used in Pacific coastal coho habitat in 1987. In the same year in the Columbia River estuarine drainage area, an estimated over 16,000 pounds of 2,4-D were used. Along the entire Pacific Coast coho habitat, over 150,000 pounds of 2,4-D were applied. Almost 1.3 million pounds of the 35 inventoried pesticides, an average of 0.43 pounds per acre of total crop land, were applied to Pacific Coast estuarine drainage areas in 1987. (Pait 1992)

There is a great need to establish comprehensive use data through state and/or federal reporting mechanisms. Quality coho protection and restoration plans cannot be developed without this vital information.

B. Residue Levels Detected in Coho Habitat Are Capable of Damage

While monitoring data are scarce, evidence from surface water residue samples shows that damaging pesticide residue levels are present in Pacific coho salmon habitats. These residue levels are capable of harming the physiology and behavior of the coho because either (a) similar levels have caused harm in laboratory experiments or field studies or (b) they have been identified as levels of concern by regulatory agencies.

In the spring of 1991, a Christmas tree plantation in Washington was aerially sprayed with the insecticide Metasystox-R and the fungicide chlorothalonil for pest-control. The Washington Department of Ecology (WDOE) took twenty-six samples from Foster Creek, a stream that traverses across the spray site. Ten of those post-spray samples had concentrations of Metasystox-R ranging from 2.4 to 4.1 ug/L. All 26 of the samples had detectable concentrations between 0.01 and 1.72 ug/L of chlorothalonil. The Water Quality Criteria used by WDOE states that levels should not exceed 0.4 ug/L for Metasystox R and 1.0 ug/L for chlorothalonil. (Rashin 1993)

Water quality criteria concentration level were exceeded for both pesticides. Harm to fish could have resulted. Metasystox-R (common name oxydemeton-methyl) is devastating to aquatic organisms (EPA 1987), and chlorothalonil is highly toxic to fish. (Ernest 1991)

Samples from the previously mentioned 1990 Amazon Creek study in Eugene, Oregon had five positive detections of the eight diazinon samples taken. According to the report's authors, these diazinon concentrations "exceeded the 1972 National Academy of Sciences maximum concentration of 0.009 ug/L recommended for the protection of freshwater aquatic life." (Rinella 1993)

On occasion, streams are mistakenly oversprayed, especially during aerial applications. Several research experiments have been done to determine the consequences these mistakes may have on the ecosystem. In coho habitat, contamination levels were detected that exceeded the Water Quality Criteria used by WDOE as follows:

> "Feng et. al. (1989) found levels up to 162 ug/L of glyphosate in a small oversprayed stream within two hours of application, and levels of 37 ug/L 16 hours post application. The first post spray runoff event resulted in stream levels of 109 ug/L. In a study of the fate of glyphosate in Oregon following forest application, Newton et. al. (1984) found a peak concentration of 270 ug/L in an oversprayed stream." (Rashin, 1993)

The Water Quality Criteria for glyphosate used by Washington Department of Ecology is 65 ug/L (instantaneous concentration). Concentrations in both locations exceeded this level when streams were directly oversprayed.

C. Improper Sampling Methods Are Likely to Miss Pesticide Detections

Adequate and appropriate testing for pesticide residues in coho habitat is not conducted currently. Some water sampling by regulatory agencies is conducted at times and in a manner that fails to document likely residue levels, therefore skewing the evidence. The concentration of pesticides traveling through or across soils into waterways often increases during significant rain storms. Testing for residues must be properly timed.

Sampling from California's monitoring is an excellent example of the need to look for contamination when an agency is most likely to detect residues. As mentioned previously, 26 percent of the 165 samples taken were contaminated with an herbicide. Of the samples taken within 24 hours after application, only eight percent were contaminated. In contrast, 38 percent of the samples taken after the first significant storm run off were contaminated. (Greene 1992)

As mentioned earlier, ODF found pesticides contaminating 17.3 percent of their samples taken within 24 hours of the spray treatment. When compared to the California agency's findings, it is clear the results of ODF's testing could have reached a much higher percentage of positive detections had ODF tested after the first significant storm runoff within 30 days of treatment. Since Oregon's testing for residue levels is conducted at a time that is unlikely to spot the greatest number of contaminated samples, ODF's conclusion is inappropriate that "none of the estimated 24-hour mean concentrations measured were at levels where they pose a risk to human health or aquatic life." (ODF 1992)

Conducting accurate tests within appropriate sampling periods is essential for coho protection. Contamination levels of pesticide residues must not reach lethal or sub-lethal levels.

D. Current Pesticide Application Practices Do Not Protect Streams from Contamination

Generally accepted practices of pesticide application have not been effective at keeping pesticides out of surface waters. In Washington for example, best management practices (BMPs) are implemented to keep pesticides out of untargeted places. BMPs include practices like providing buffer zones along streams, maintaining vegetation to intercept pesticides drifting directly into streams, and requiring maximum wind speed and other weather standards. Recent information shows these types of practices are only partially or are not effective at fulfilling the stream protection function.

An evaluation was done by Washington State Department of Ecology to determine the effectiveness of the BMPs. The Department determined that BMPs are only partially effective at meeting the agency's water quality standards (i.e., keeping residues below predetermined levels of contamination). BMPs were <u>not</u> effective at keeping pesticides out of stream protection buffers, and they failed to avoid off-target drift as required by EPA-approved labels. (Rashin 1993)

III. Summary and Recommendations

Coho salmon can be directly and indirectly affected by lethal or sublethal concentrations of pesticide residues in surface water. Pesticide residues are widespread in coho habitat. Some residue concentrations have been detected in Northwest surface waters that are capable of harming coho salmon. With the exception of California, regulatory agencies do not know what pesticides are used throughout the coho salmon range. The public does not know the identities of all the "inert" ingredients in pesticide and adjuvant products. Sampling for residues by regulatory agencies is not always conducted in periods most likely to detect residues and at the highest concentration levels that are likely to appear. Pesticide application practices that are routinely used to protect surface water from contamination are only partially or are not effective at keeping pesticides out of streams.

Based on these findings, the following recommendations need to be adopted and implemented:

1. <u>Prevent pesticide contamination of coho habitat by reducing or eliminating pesticide use.</u> Alternative pest management approaches that do not depend on pesticide use in agricultural and non-agricultural settings are being successfully implemented throughout the Pacific Northwest and elsewhere. Much can be done to promote a major shift to non-chemical pest control, including training, technical aid, financial incentives and disincentives, pilot and demonstration programs, and informational exchange opportunities. All these methods enable users to reduce or eliminate their use of pesticides. Support for legislation at the federal (e.g., the 1995 Farm Bill) or at the state level can go far to establish innovative and quantitatively-meaningful pesticide use reduction programs. Administrative opportunities must also not go ignored.

2. <u>Establish "pesticide-free" zones in critical coho habitat.</u> Adequate coho protection may not be possible in some areas without restricting use of pesticides.

3. <u>Gain comprehensive pesticide use reporting in all states within coho habitat.</u> Borrowing the California pesticide use reporting system as the template, government must establish state-level

pesticide use reporting in Oregon, Washington and Idaho. Access to information about what pesticides are used within the coho's range will be instrumental in developing quality protection plans.

4. Take the secrets out of pesticides by requiring that pesticide and adjuvant product labels identify all ingredients in formulations. Public agencies need to request pesticide and adjuvant manufacturers and formulators to identify all ingredients in their products. Better yet, public agencies, pesticide users, and citizens must insist on amendments to the national pesticide law that require disclosure of all ingredients on product labels.

5. Improve sampling and monitoring methodology within coho habitat to increase testing and ensure tests are taken at times most likely to detect pesticide residues. Regulatory agencies must increase the number of samples taken to look for pesticide contamination in the watersheds that comprise coho habitat. In addition, California's sampling clearly shows that pesticide residues are more likely to enter surface waters during significant storm runoff, rather than during the period immediately following pesticide treatment. Public agency sampling methodology must make adjustments to ensure that testing is likely to detect contamination.

6. Consider all the uncertainty about the potential effects of pesticides on coho when setting water quality standards. Water quality standards are set by regulatory agencies to permit how much pollution to tolerate. Contamination levels above these standards are deemed unacceptable. Basically, a standard-setting process asks how much pollution to accept, rather than asking how little can be generated. While the value of water quality standards is questionable, some government agencies are setting water quality standards for fish species. It is clear that juvenile fish succumb more easily to toxins in water, that laboratory studies do not mimic the natural life cycle of fish, and that little is known about the ecological damage caused by pesticides that can indirectly affect coho salmon. These factors must be considered in setting standards. In the face of this uncertainty, an emphasis on setting acceptable water quality standards for coho is probably not worth the effort. Much more can be gained by emphasizing how to eliminate the introduction of these toxic substances into the watersheds that comprise coho habitat.

Pacific coho salmon protection presents a unique challenge to the citizens of the Pacific Northwest and the United States. The impact of pesticides residues on coho is just one aspect of what must be addressed in meeting this challenge. The cooperation of urban and rural dwellers alike will be integral to reversing the trends that have made the region's water so toxic that it threatens Pacific coho salmon. The greatest promise is in stopping the enormous volume of toxic pesticides intentionally and regularly added into the environment by foresters, farmers, homeowners, and government bodies. This must be part of the work ahead.

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2,4-D and Cancer: EPA Remains Indecisive While Reporting New Evidence of Dioxin Contamination

The often debated question of whether or not the widely-used phenoxy herbicide 2,4-D causes cancer was given another inconclusive answer this spring by the U.S. Environmental Protection Agency (EPA).[1] This recommendation deserves attention in view of the accumulating evidence that use of 2,4-D is in fact associated with increased cancer risks in humans and other mammals.

A special committee, called the Special Joint Committee on the Weight of Evidence of Carcinogenicity of 2,4-D, created to advise EPA's Science Advisory Board and its FIFRA Scientific Advisory Panel, concluded that there is "weakly suggestive" evidence that 2,4-D is a human carcinogen.[1]

Epidemiology (studying the factors that determine the incidence and distribution of a disease) is a difficult science. Humans are exposed to a wide variety of disease-causing factors, and discerning cause and effect under these conditions is complex.

However, a striking number of studies has now shown that 2,4-D use, or use of phenoxy herbicides in general, is associated with increased cancer risks.

These include three studies of soft tissue sarcoma in Sweden, one study of soft tissue sarcoma in Italian farmworkers, a study of non-Hodgkin's lymphoma in Kansas farmers, a similar study in Nebraska, a study of non-Hodgkin's lymphoma in Washington forestry workers,[2] and a study of prostate cancer in Canadian farmers.[3] Increased risks of both non-Hodgkin's lymphoma and soft tissue sarcoma have also been found in workers manufacturing phenoxy herbicides.[2] (Other studies have been unable to measure any increased risk associated with 2,4-D exposure.)[2] In addition, dogs living in homes with lawns treated with 2,4-D suffer from more lymphoma that dogs living in houses with untreated lawns.[4]

Up to 65 million pounds of 2,4-D are used in the U.S. each year; it is among the top five most widely used pesticides in the U.S.[5] Prudence should indicate that the use of this herbicide needs to be reduced. Pressures to do otherwise, however, are enormous. Of the 14 speakers who presented information to the EPA Special Joint Committee, 12 were from the 2,4-D industry, and most were interested in pointing out methodological flaws in the studies linking 2,4-D and cancer. [2]

EPA data that the Special Joint Committee was not asked to consider are extremely interesting. In March, an EPA memo revealed that tests performed by 2,4-D manufacturers in response to a 1987 EPA request had found tetrachloro- and pentachlorodibenzo-*p*-dioxins (TCDDs and PCDDs) in technical (unformulated) 2,4-D.[6] 2,3,7,8-TCDD, the most toxic dioxin, was found in 2 of the 8 samples analyzed at levels above the 1 part per billion (ppb) level of concern specified by EPA. Another dioxin, 1,2,3,7,8-PCDD, was found in three of the eight samples at levels up to twenty times higher.[6] 1,2,3,7,8-PCDD is thought to be about half as toxic as 2,3,7,8-TCDD.[7]

Ironically, EPA officials have recently stated that adverse effects of dioxin (2,3,7,8-TCDD) may be occurring in people at levels at or near current background levels (the levels found in average Americans.) [8] Dioxins are persistent and bioaccumulative.[9] Tiny amounts of 2,3,7,8-TCDD have been shown to cause cancer in humans,[10] as well as cancer, fetal death, birth defects, reduced fertility, and miscarriages in laboratory animals.[9]

This means that the potential effects of any increased exposure to dioxins from the 2,4-D used in the U.S. are serious. In addition to exposure from 2,4-D residues on food, U.S. residents are exposed from the over 30 million applications of 2,4-D made each year to yards and gardens in this country.[11] 2,4-D has also been found in groundwater in fifteen states, potentially exposing large numbers of people through their drinking water.[12] The message seems unmistakably clear: It's time for change. —*Caroline Cox*

Caroline Cox is JPR's editor.

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(21)

TO: *Bruce Halstead, US Fish & Wildlife Service*
Honorable John Burton, California State Senate President Pro Tempore

DON'T GIVE CHARLES HURWITZ A LICENSE TO KILL!

The "Headwaters Forest agreement" between Maxxam Corporation CEO Charles Hurwitz and the state and federal governments is dependent upon approval of a "Habitat Conservation Plan." This document, far from "conserving" anything, in reality gives the company a "license to kill" endangered species for the next fifty years. ***The Plan, recently released to the public, is an ill-considered compromise that will result in decades of continued forest destruction in Northern California.*** Specifically, the Plan:

- ➤ allows Maxxam to clearcut thousands of acres of ancient redwood and Douglas-fir forest;
- ➤ sets such a poor precedent for protection of streams that it could well lead to the extinction of salmon and steelhead trout in coastal California ;
- ➤ prevents citizens and biologists from taking future action to protect fish, wildlife and forests, even if those actions are scientifically necessary;
- ➤ leaves a legacy of ruined streams, collapsing hillsides, devastated forests and vanishing wildlife for generations to come.

Maxxam and its subsidiary Pacific Lumber are known environmental criminals, and have been convicted of numerous violations of state forestry laws. We can't trust Charles Hurwitz and his pals with the future of our forests, rivers, fish and wildlife!

As concerned citizens, we the undersigned demand that
a) no "license to kill" disguised as a "conservation plan" be given to Hurwitz; and
b) Governor Pete Wilson's request for Headwaters agreement funding in the state budget be denied.

Signature	*Print Name*	*Address, City ,State, Zip*
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[illegible]	[illegible]	4[illegible] Camino [illegible] Mill Valley

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Signature	*Print Name*	*Address, City ,State, Zip*
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ATT. 4

When Ignorance Is Not Bliss: Secret "Inert" Pesticide Ingredients

By Caroline Cox

One of the cornerstones of a democracy is that information is made available to citizens so that they can participate in decision-making processes as knowledgeable partners. Where information is not available or is kept secret, a democracy cannot function as it is intended. This becomes strikingly clear in a discussion of secret "inert" pesticide ingredients. As an illustration, consider the following story:[1]

It's spring, 1992, in Hinsdale, Illinois. Hinsdale is the home of Doug Fleming, age 14, acutely sensitive to a variety of chemicals, and Diana Fleming, his mother, trying to keep her son healthy. It's also home to gypsy moth caterpillars and a proposal for a *Bacillus thuringiensis* (B.t.) eradication program.

Hinsdale officials planned to spray the village from helicopters as part of a statewide gypsy moth control program. Clearly, there are many issues that one might want to consider in a careful evaluation of the health and environmental impacts of such a program: What other caterpillars will be killed by the B.t.?[2] What is the potential for infections in humans?[3]

However, neither of these became the most important problems for Diana and Doug Fleming. Instead, they focused on the secret "inert" ingredients. (See "Some Important Definitions," right.) Abbott Laboratories, manufacturer of the Dipel 8AF formulation proposed for use, had announced that it would reveal "inerts" to physicians. Fleming made arrangements for a conference call among a toxicologist, Doug's physician, and Abbott Labs. Unfortunately, the call was unsuccessful because Abbott didn't have any records indicating Hinsdale has purchased B.t. products. Fleming was eventually able to solve the problem and arrange for another conference call, but the beginning of the spray program was now imminent.

Doug's doctor decided that one of the "inerts," sodium sulfite, may pose problems for Doug. Sulfites are commonly used as food preservatives, but some people have allergic reactions to breathing sulfur dioxide, a gas given off by sulfites. Documented deaths have occurred in customers of restaurants where sulfites were in use.[4,5] Tests showed that Doug, in fact, does have a strong reaction. The family had to leave town almost immediately.

This story is an illustration of the essential problem with "inert" ingredients of pesticides. They're secret and therefore unpredictable in their effects. However, the problem doesn't stop there, as the Flemings' story also illustrates. As "inerts" are identified and studied, problems continue to surface. This article discusses some of these problems and their significance for pesticide reform.

I Don't Know, You Don't Know: Who Does?

Because the identity of "inerts" is not made public, all of us who use pesticides, eat food that has been treated with pesticides, drink water containing pesticide residues, and live, work, play, or study where pesticides have been used, are exposed to unknown chemicals. How can we find out if we are being exposed to toxic compounds? Who can identify these chemicals? Pesticide manufacturers, we assume, know what is in the products they make and the products of their competitors. This assumption turns out not to be completely true. For example, Monsanto Agricultural Company in 1991 provided NCAP with a list of the ingredients in their herbicide Roundup. The fourth ingredient on the list is "related organic acids of glyphosate," but is not identified with any more accuracy.[6] Monsanto is not able to, or does not wish to, specifically identify this portion of the product's "inerts."

The U.S. Environmental Protection Agency (EPA), we assume, should know the ingredients in pesticide formulations. This assumption also turns out not to be true. EPA's Office of the

Some Important Definitions

"Inert" when applied to pesticide ingredients does not mean biologically, chemically, or toxicologically inert. Under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the national pesticide law, "inert" ingredients are defined simply by excluding "active" substances.[1]

Active Ingredient. An ingredient which will prevent, destroy, repel, or mitigate any pest. Under FIFRA, three other categories of biologically active chemicals are included in the definition of an active ingredient: 1) plant regulators which change the growth rate, the maturation rate, or other behaviors of crop or ornamental plants, 2) defoliants which cause foliage to drop from a plant; and 3) desiccants which artificially accelerate drying of plant tissue.[1]

"Inert" Ingredient. Any pesticide ingredient other than an active ingredient.[2] Almost all pesticide formulations contain some "inert" ingredients. They are used as solvents, surfactants, diluents, carriers, catalysts, synergists, intensifiers, and more than 30 other uses.[3] (See Figure 1.)

"Inerts" must be intentionally added (not a contaminant), according to EPA, and do not include adjuvants added by the pesticide user.

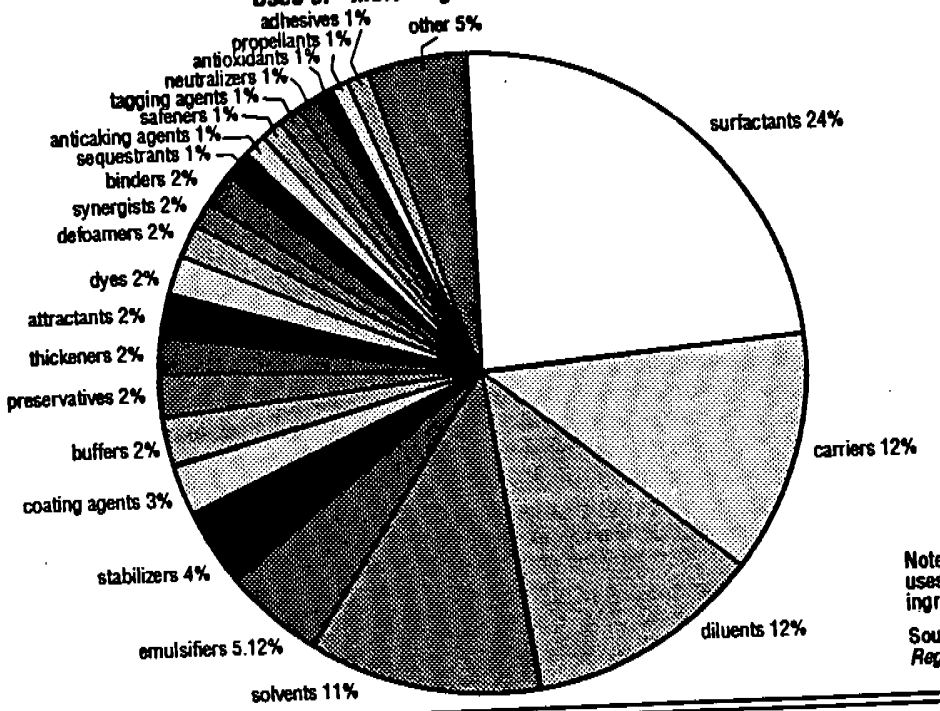
Secret Ingredient. Any pesticide ingredient not disclosed on the pesticide label.

Full Formulation. The combination of active and "inert" ingredients in a pesticide as it is commercially sold. Many formulations are mostly "inert" rather than active ingredients. (See Figure 2.)

1. FIFRA Section 2(a).
2. FIFRA Section 2(m).
3. 40 CFR 180.1001.

Caroline Cox is JPR's editor.

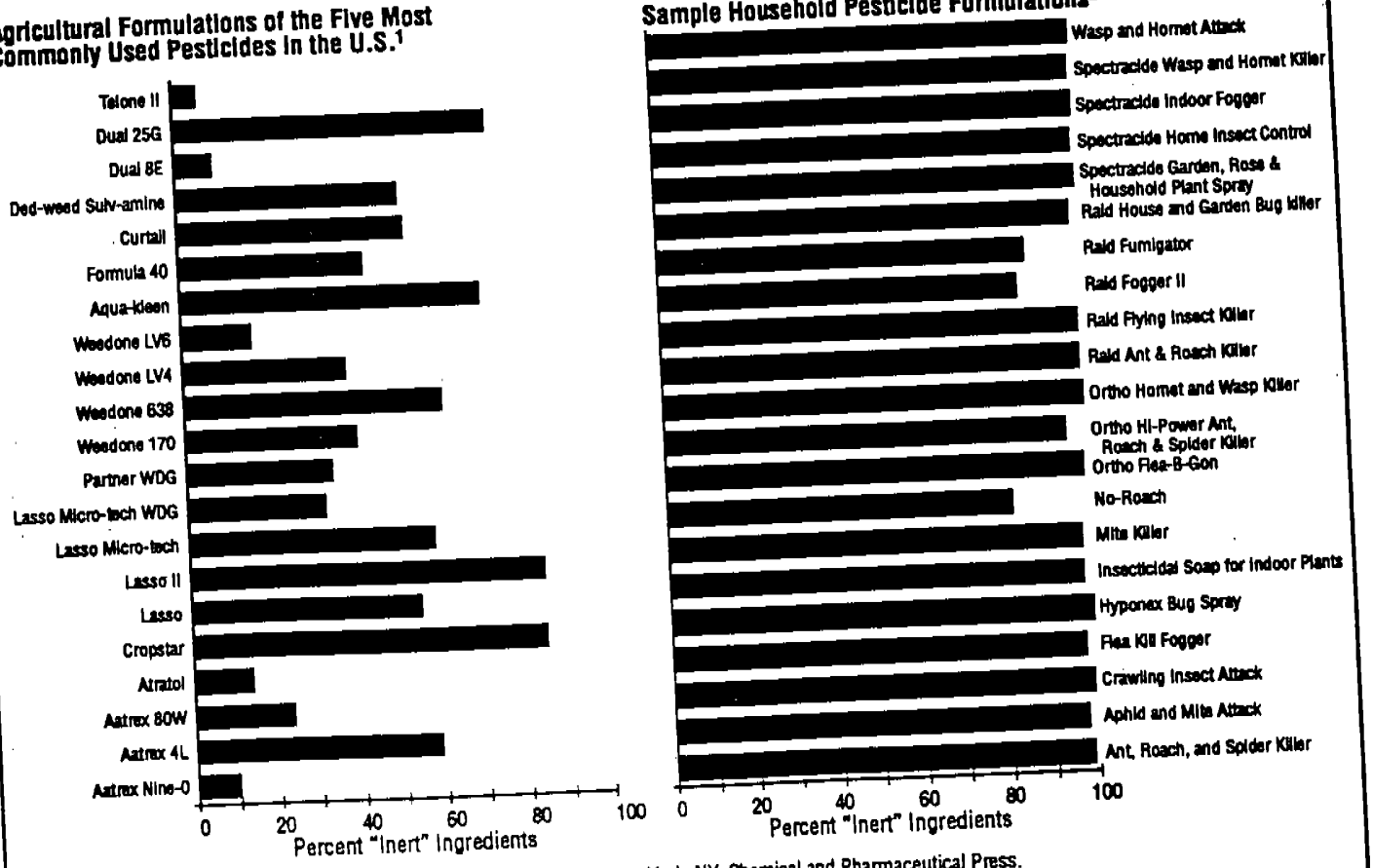
Figure 1
Uses of "Inert" Ingredients in Pesticides



Note: This chart is based on the uses of about 600 "inert" ingredients, not a complete list.

Source: 40 *Code of Federal Regulations* 180.1001

Figure 2
"Inert" Component of Agricultural and Household Pesticide Products



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Inspector General (OIG) reported in 1991 that EPA's pesticide data base, PPIS, contained about 600 entries in which the "inerts" were identified only as "chemical name not available." In addition, the OIG audited a random sample of 50 pesticide products in the data base and discovered that almost half contained errors in the identification and coding of "inerts."[7]

In fact, EPA's inability to identify "inerts" leads to situations that could be called absurd. In 1990, EPA responded to a Freedom of Information Act request filed by North Carolina resident Elizabeth Iglesias. Among other questions, she asked if hazardous wastes could be "recycled" into pesticides, as active ingredients, "inert" ingredients, or otherwise. EPA responded, "Hazardous waste is legally allowed by EPA to be recycled into pesticides," then went on to say that it had not *been possible* to determine if any pesticide product currently registered contained such materials.[8]

Aren't Most "Inerts" As Nontoxic as Water?

While their name suggests otherwise, "inert" pesticide ingredients vary widely in their acute and chronic toxicity. Some, like water, honey, wheat, carrots, and sawdust are relatively nontoxic to most people, other animals, and plants. Others, such as methylene chloride, methyl bromide, and naphthalene, are or were active ingredients in pesticides and are clearly acutely toxic to living things.[9,10] EPA has evaluated the toxicity data it has available for "inerts" and has concluded that it does not have adequate information to evaluate the toxicity of most "inerts." (See Figure 3.) About 75 percent of the "inerts" identified in the OIG audit are of "unknown toxicity."[7]

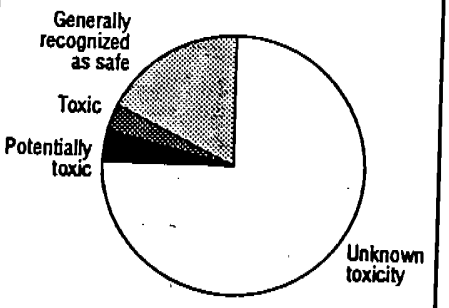
A large number of "inerts," however, belong to classes of chemicals that have been linked to serious health or environmental impacts. A review of some of the problems associated with these classes of chemicals is an interesting introduction to the possible hazards of "inerts." For example, consider the hazards that have linked to surface active agents, organic solvents, and propellants:

Surface-active agents: Surface-active agents reduce the surface tension of water.[11] Detergents, surfactants, emulsifiers, and foam suppressants are all surface-active agents used as "inerts."[12] They form a bridge between two chemicals that don't mix readily: oil and water or water and a waxy leaf surface, for example.[13]

Surface-active agents are often toxic to fish and other aquatic organisms. This was unfortunately well illustrated when the oil tanker Torrey Canyon accidentally spilled crude oil along European shores. Cleanup crews used about 10,000 tons of detergents to disperse the oil, resulting in massive kills of marine organisms. The entire animal population of the beaches was destroyed, with the exception of a handful of species.[14] Gilled animals are particularly susceptible.[15]

Lungs, as well as the digestive system, appear to be damaged in humans poisoned by surfactant-containing pesticide products.[16,17]

Figure 3
EPA's Classification of the Toxicity of Inert Ingredients



Source: U.S. EPA. Office of the Inspector General. 1991. Report of audit: Inert ingredients in pesticides. Washington, D.C. (September 27.)

Plants may also be damaged by surface-active agents. For example, an emulsified formulation of the fungicide triforine is toxic to blueberry pollen. A study showed that virtually all of the toxicity could be accounted for by one of the "inerts" rather than any phytotoxicity of the active ingredient.[18]

Organic Solvents: Exposure to organic solvents is associated with a variety of toxicological problems, including an increase in the frequency of miscarriages if either parent is exposed,[19,20] neurobehavioral abnormalities,[21] and liver cancer in women.[22] Almost 10 million workers in the U.S. (only a fraction of these work at pesticide-related jobs) are occupationally exposed to solvents. Household exposures also occur. The behavioral and neurological problems (headaches, euphoria, confusion, dizziness, numbness, muscle weakness, emotional disorders, and sleep disturbances) are probably common to most solvents. "All solvents are soluble in fat and will at some level of exposure produce effects on the central nervous system," concluded Congress' Office of Technology Assessment.[23]

Specific classes of organic solvents are particularly problematic. Glycol ethers, for example, cause anemia; intoxication; irritation of the eyes, nose, and skin; birth defects; and damage to sperm and testes.[24] In 1984, a glycol ether-containing formulation of the insecticide Safrotin (the active ingredient is an organophosphate, propetamphos) was associated with illness in a bus driver who was exposed to the insecticide when she entered her bus the morning after a routine insecticide treatment.[25]

Xylenes are another class of problematic solvents. They cause skin, eye, nose and throat irritation; impaired memory; liver and kidney damage; incoordination; dizziness; hearing loss; and fetal death and decreased fetal weight gain during pregnancy.[26] Risk of exposure is high because they are used in almost 2,000 pesticide products.[27]

Organic solvents in association with pesticide active ingredients have also been detected in groundwater,[28] adding to concerns about widespread exposure.

Propellants: The chemicals used to propel aerosol pesticide products from their containers (in foggers, for example) are a sobering illustration of the problems with "inerts." About 233 million aerosol pesticide containers are manufactured each year in the U.S.[29] Many of these products contain hydrocarbons, like butane and propane, as propellants. These chemicals are highly flammable. When such a pesticide product is used to "fog" a room, often unventilated, the vapors can easily ignite. In fact, one fire marshal has reported that arsonists were collecting insurance money by setting foggers in a room, then allowing a pilot light to set the building on fire. The arsonists could not be prosecuted or denied the insurance money because the foggers were being used in accordance with the label (which does not require extinguishing pilot lights).[30]

As alternatives to flammable hydrocarbon propellants, some pesticide products use chlorofluorocarbons (CFCs), notorious for their ability to destroy stratospheric ozone. At least

half a dozen CFCs are used as "inert" propellants[10] in 170 pesticide products.[31] Depletion of stratospheric ozone has been linked to a number of crucial global health and environmental problems including an increase in the frequency of skin cancer, an increase in the frequency of cataract blindness, decreased efficiency of human immune systems, a decrease in world food production, and extinction of some species.[32]

Synergy

One of the most frightening potential problems with pesticide "inert" ingredients is the potential for synergism among several "inerts" or among "inerts" and active ingredients. Given the large number of possible combinations of chemicals and the small amount of testing required for "inerts," information on this subject is sketchy. It does, however, clearly illustrate the pressing need for more studies.

For example, researchers studying the movement of Esteron 99 (an herbicide with the isooctyl ester of 2,4-D as active ingredient) through protective gloves discovered that the "inerts" in the formulation reduced the protection offered by the gloves.[33] The "inerts" appeared to permeate the glove material first, and then helped bring the 2,4-D ester across.

Similar synergistic effects have been documented for both acute and chronic toxicity. The synthetic pyrethroid insecticide Pydrin 2.4 EC is more acutely toxic to mice than is its active ingredient fenvalerate, for example,[34] and the carbamate herbicide Fargo is twice as acutely toxic to midge larvae as its active ingredient triallate.[35] The carcinogenicity of the fumigant Telone II in laboratory animals is due to both its "inert" stabilizer, epichlorohydrin, and its active ingredient, 1,3-dichloropropene.[36] With so much of the toxicology of "inerts" unknown and the enormous number of pesticide formulations, it seems nearly inevitable that some dangerous combinations of ingredients will occur.

Taking Action

Synthetic pesticides have caused a wide range of health and environmental problems in the half-century that they have widely used: persistence and biomagnification, resistance, human toxicity, and groundwater contamination to name just a few. Expanding the definition of pesticides to include their secret "inert" ingredients expands the number and scope of these problems. It is a crucial step if we are to fully account for the damage that pesticides can cause.

The issue of "inerts" also provides a link between pesticide reform and some basic concepts that are fundamental to democracy as most Americans envisage it. Because citizens deserve to know about their exposures to toxic chemicals at work and at home, and deserve the right to give their informed consent to such exposures, secret "inert" ingredients are unacceptable. By taking this message to neighbors, elected officials, resource managers, and pesticide users, we are using the the "inerts" issue as yet another tool to reduce pesticide use and promote sustainable alternatives. ■

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Taking the Secrets Out of Pesticide Products: How to Use "Inerts" to Promote Alternatives

By Norma Grier

Many problems stem from the fact that the national pesticide law allows secret ingredients in pesticide products. One example is that in 1992 the U.S. Environmental Protection Agency (EPA) does not know exactly how many or which ingredients are added to pesticide formulations as "inert."

In 1987 when EPA announced its policy on inert ingredients, the number of different ingredients was assumed to be about 1,200[1]; now it's 1,820.[2] (See Figure 1.) In the four years since amendments to the national pesticide law were passed in 1988, the number of products on the market has decreased from roughly 45,000 to about 20,000.[3] While the number of pesticide products has gone down, the number of secret ingredients known to be added to pesticide products has gone up.

Any list produced at EPA is certain to keep changing. In the memo that accompanied the most recent list, the EPA's Office of Pesticide Programs (OPP) stated, "At the present time, OPP records do not readily permit the confirmation of the presence of any given listed inert in currently registered pesticide products....[T]he fact that a particular chemical is not on the list does not mean that it is not present as an inert ingredient in a registered pesticide product; it may have been inadvertently omitted from the list."[2]

This inability of EPA to compile a list of "inert" ingredients is just one example of regulatory dysfunction. (See "How Are "Inert" Ingredients Currently Regulated?" p. 7) The current regulation of pesticide secret ingredients is outrageously inept. The issue remains a low priority at EPA. The 1991 resources devoted to "inert" ingredients were less than one percent of all the resources dedicated to pesticide programs, and this is not likely to change immediately.[4]

In the face of EPA inaction, citizens must take action on "inerts." Most importantly, activists can use the "inerts" issue to ensure the use of alternatives to pesticides, to press for substantive change in how pesticides are used. Further, citizens' demands for full disclosure of the identity and damage potential of all ingredients in pesticide products will mean that those who promote pesticides will no longer be able to hide in a cloak of secrecy.

Forcing Change in Pesticide Use through Promoting Alternatives

Citizens need to use strategies that can result in more than an adjustment of the spray nozzles calibrating the annual stream of pesticides entering the environment. Citizens have a responsibility to think of strategies that are most likely to get people to lay down their spray guns. This section explores several options for pressing for the use of alternatives, both in the absence and presence of knowing the ingredients in pesticide products.

Emphasize the Unknowns: As long as the public does not know what is in a pesticide, citizens need to remind users of pesticides that they do not know what it is they are spraying. Without knowing ingredients or their effects, no one can say that the environment will not be damaged or that human health will not be at risk from using pesticides.

Community activists need not hold back. Any school board that understands the ignorance about pesticide ingredients will be less likely to endorse pesticide sprays around school children. Consumers will insist more strongly that pesticides be taken out of the food supply. Homeowners would stop directing spray cans at cockroaches in their kitchens and use alternatives. The lack of information about what is being sprayed is a powerful tool for advocating alternative treatment methods.

Secure Informed Consent: Since Rachel Carson's *Silent Spring* first publicly raised the issue,[5] the pesticide reform movement has argued that American citizens have a right to be free from exposure to toxics unless they have given their informed consent to such exposure. As laws and regulations are enacted that implement this principle, we need to be sure to include the "inert" ingredients in a pesticide product.

Informed consent is clearly applicable to relationships such as those between landlord and tenant, employer and employee, and school administration and the student's parents. For example, a landlord would get the written informed consent of apartment building residents before using the herbicide Roundup to control grass around the base of the playground swing set. The consent form would include the identity of all the ingredients in Roundup and indicate that the surfactant in the formulation, POEA, is three times more acutely toxic than the active ingredient.[6] The form would list adverse testing results for all the ingredients. The consent form would also discuss hand pulling and other alternatives that could work on that site.

Ban Secrets: Nothing stimulates alternatives faster than curtailing pesticide use. Citizens can insist on designating a date when a pesticide product will be prohibited unless there is disclosure of that product's secret ingredients and the consequences of their use. A federally set date for a ban on secrets would be uniform nationwide. Industry will balk at ending its secrets and products will no longer be available.

Citizens need to pressure Congressional representatives to ensure that EPA's Office of Pesticide Programs (OPP) turns its priorities around.

OPP must shift its budget allocations from regulating pesticides to

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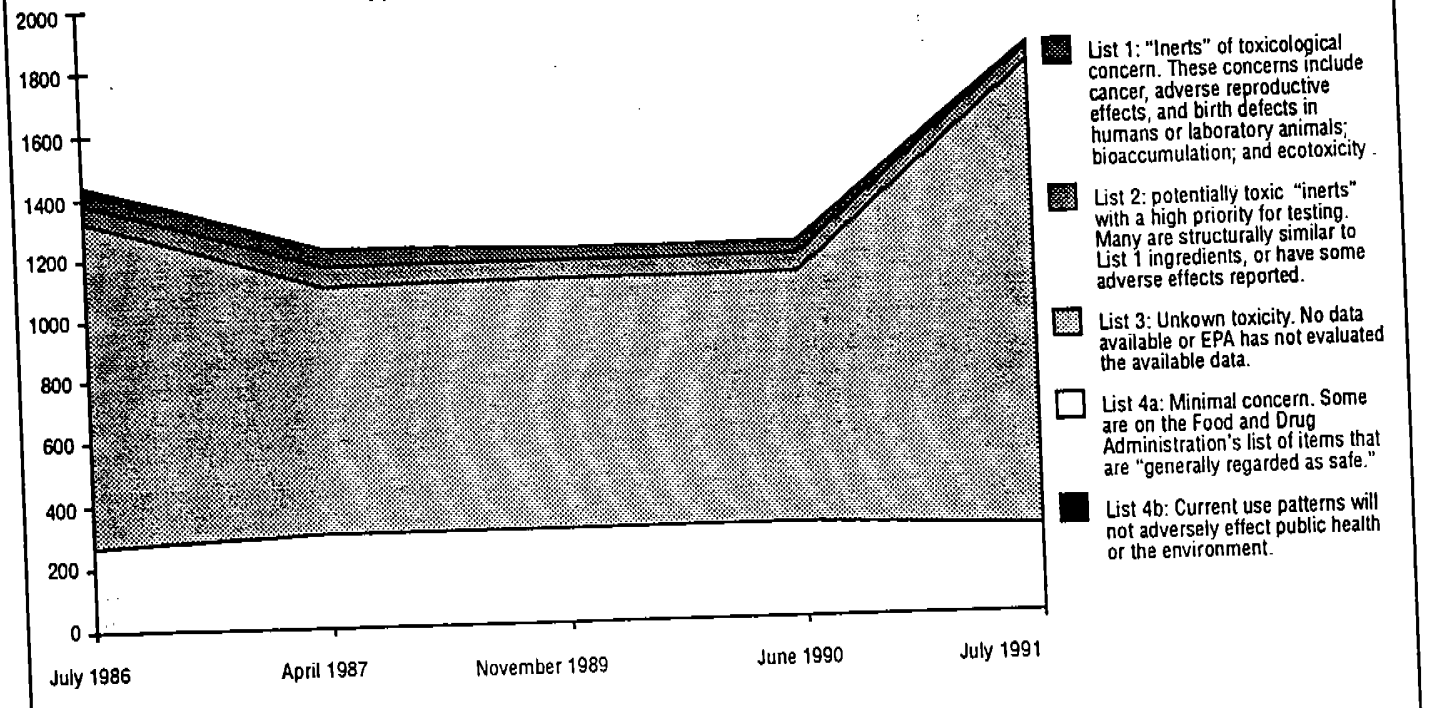
Norma Grier is NCAP's executive director.

Figure 1
Apparent Numbers of "Inert" Pesticide Ingredients on EPA Lists



Sources:
U. S. EPA. 1985. unpublished list provided to NCAMP through the Freedom of Information Act. (July 25.)
U.S. EPA. 1987. Inert Ingredients in pesticide products; Policy statement. *Federal Register* 52(77):13305-13309. (April 22.)
U.S. EPA. 1989. Inert ingredients in pesticide products; Policy statement; Revision and modification of lists. *Federal Register* 54(224):48314-48316. (November 22.)
U.S. EPA. 1990. Inert ingredients in pesticide products; Policy statement; Revision and modification of lists; Correction. *Federal Register* 55(126):26753. (June 29.)
U.S. EPA. 1991. Unpublished list provided to NCAP through the Freedom of Information Act. (July 23.)

preventing pests and promoting alternatives. Now, over $20 million (about 40 percent of OPP's budget) goes for pesticide reregistration of *active* ingredients.[4] This does not include all ingredients in a product. Any effort to ban secrets in pesticides gives us a great opportunity to stress the prevention of pest problems and implementation of alternatives.

Requiring Full Disclosure and Testing

Citizens must argue that pesticides can only be used if the public knows what is in products, where they are applied, and what consequences may result from their use.

Identify All Ingredients: Anybody who buys a package of cookies at the grocery store can read the label and find out what ingredients are in the cookies before paying for them. But nobody can know the ingredients in the pesticides sold in the next aisle in the same grocery store. Just like other consumer products such as food, drugs and cosmetics, pesticide labels need to list the all ingredients. Additionally, consumers need to know the percentage of each product ingredient and all contaminants that are present.

Identify harmful effects: Consumers, workers and community residents have the right to know what harmful effects can result from exposure to pesticide ingredients in their workplaces and neighborhoods. If any ingredient or contaminant in a pesticide product poses toxic concerns, it needs to be clearly disclosed on the label stating, "Exposure to _____ has caused adverse reproductive effects in humans."

Admit Ignorance: Conversely, if required testing or studies have not been adequately done to determine if an ingredient poses toxic concerns to health or the environment, the label needs to admit that the potential to cause specific adverse effects is unknown by stating, "Required testing has not been performed to determine if exposure to _____ may cause birth defects, skin irritation, genetic damage, or fish kills."

Labeling and testing disclosure requirements are regulated by the national pesticide law, the Federal Fungicide, Insecticide and Rodenticide Act (FIFRA). Expanded labeling requirements would have to be passed by Congress. Since major legislative changes are difficult for community-based citizen groups to pass single-handedly, grassroots pesticide reform organizations need to build an effective coalition of local, regional and national groups to effect these changes. The National Coalition Against the Misuse of Pesticides is launching a major effort to pass a National Pest Management Act in the next decade.

Require Posting and Notification: It is only reasonable that people be informed about where pesticide treatments are made or are going to be made, so they can know not only what they are being exposed to, but where. All treatments for which there is a potential for public exposure need to be posted. Public eateries post warnings that microwave ovens are in use so individuals with heart pacemakers can be informed. Similarly, by posting that a bank, library, restaurant, court-

How Are Inert Ingredients Currently Regulated?

Since 1987, EPA has grouped "inert" ingredients into four lists.[1,2] (See Figure 1.) The most recently available 1992 list of ingredients does not indicate on which of the four inerts lists each ingredient belongs.[3]

"Inerts" are regulated differently if they have been placed on List 1.[1] Since October 20, 1988, manufacturers of pesticide products that include List 1 ingredients have been required to list those ingredients by name on the pesticide label. Manufacturers were also encouraged to substitute apparently less hazardous ingredients for the List 1 chemicals found in their products. The point was to substitute ingredients not on List 1 or 2 for those that were known or suspected to be of toxicological concern.

If a List 1 ingredient is added to a product, the manufacturer may be asked by EPA to generate data as extensive as that required of an active ingredient. However, if a manufacturer shows that little exposure results from a pesticide's use, all the requirements could be waived.[1] According to a September 1991 EPA report, data waiver requests had been submitted for 8 of the approximately 56 ingredients considered to be List 1 ingredients.[4]

For any *new* inert ingredients added to products after 1987, basic chemistry, contaminant and limited toxicity data (some sub-chronic toxicity tests, a birth defects test and three types of mutation tests) must be generated in order for EPA to assess risks posed by their use. The limited toxicity tests do not include chronic toxicity, reproductive effects, cancer, neurotoxicity tests, and most ecotoxicity and environmental fate tests.

No data requirements were imposed in 1987 on ingredients other than those on List 1 although EPA said it was committed to finding out what it could about the concerns posed by List 2 ingredients. No regulatory procedures or timeframes were identified to ensure that List 2 ingredients were reviewed. EPA stated in 1987 that it had no intention of taking further regulatory action on Lists 3 and 4.[1]

Over the years, EPA has made changes in how specific ingredients are classified. (See Figure 1.) Some ingredients were removed from lists because they are no longer known to be in any pesticide products, or were reclassified onto another list because of different health or ecotoxicity hazard than was first presumed, or were stricken from the list because they were pesticide contaminants. By the swelling in the total number of ingredients by almost four hundred between 1986 and 1992, it is apparent that EPA has identified quite a few ingredients in pesticide products that were not previously considered "inerts."

EPA cannot currently produce a list of all ingredients found in pesticide products or which ingredients are found in specific products. Apparently, to do so would require manually searching 20,000 product registrations. This is reprehensible.

EPA is developing a new computer data base that will allow such a list to be developed. A pilot project with 600 registrations is supposed to be completed in September 1992; all information on 20,000 registrations is scheduled to be available by September 1993, permitted adequate funding.[4] Unless EPA has a reliable way of tracking what ingredients are found in which registration, it is unlikely that the agency could even enforce the minimal provisions of existing policy, much less expanded disclosure requirements.

Although the purpose of EPA's 1987 inerts strategy was to reduce the potential risk of adverse effects from the use of pesticides containing toxic inert ingredients, "Currently, [EPA] has no guidelines as to what should be done, by whom, or by when to effectively execute the Inerts Strategy."[4]

1. U.S. EPA. 1987. Inert ingredients in pesticide products; Policy statement. *Federal Register* 52(77):13305-13309. (April 22).
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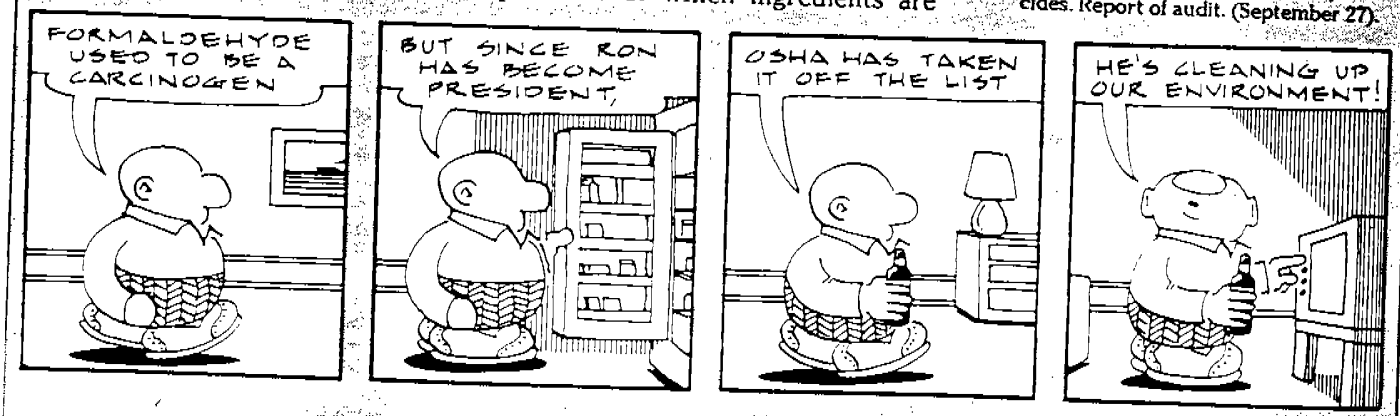


Bruce von Allen

Formaldahyde was a List 1 "inert" in 1987. In 1989, it was removed from EPA's "inerts" list because it was no longer being used in pesticide products. In both 1991 and 1992, however, it reappeared in the "inerts" list.

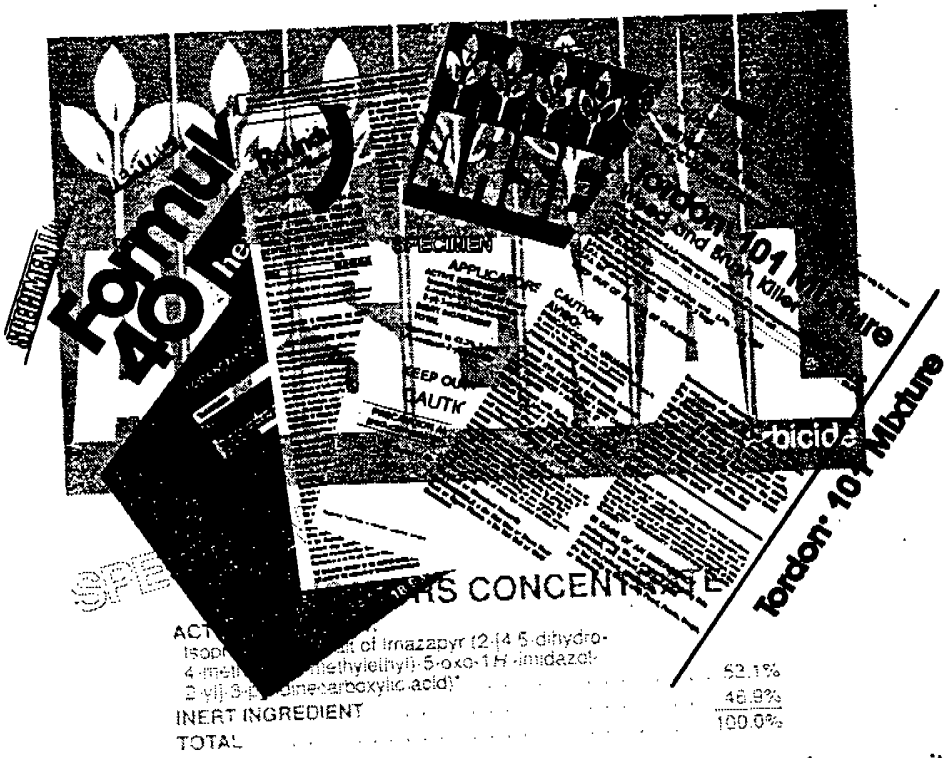
house, store, park, or neighborhood lawn has been sprayed, citizens can know they are being exposed to a pesticide. As a first step, citizens need to pass community ordinances requiring posting and notification. Similar legislation needs to be passed at the state and federal level. All of the posting and notification must include notification about "inert" ingredients.

Require Full Testing: Clearly there is little justification for allowing "inerts" to be used without being as carefully tested as are active ingredients. However, requiring testing of "inerts" for the full range of health and environmental hazards has both pros and cons.

On the positive side, testing all ingredients for damage potential would certainly reveal that pesticide use problems result from more than active ingredients. By testing all product ingredients singly and in combination the testing could identify synergistic effects that occur in mixtures of pesticides. The costs of performing the tests and assessing them at EPA need to be borne by the manufacturers who stand to profit from pesticide sales. Industry representatives now estimate that the cost of getting a product from the research lab to market is $35-50 million.[7] Additional costs for testing all product ingredients will raise the market cost of pesticides, but that only reflects what pesticides *should* cost. Higher costs will mean fewer pesticide products are registered and used.

On the negative side, manufacturer-initiated testing has been less than exemplary. Testing laboratories have falsified data.[8,9] Federal registration gives an aura of authenticity to the evaluative process, even when the agency does no independent thinking and cuts and pastes inappropriate industry conclusions. (See JPR 4(3):25-26 and JPR 5(2):21-22.) Often, industry tests are used in risk assessments to justify "acceptable" risk. (See JPR 8(1):7-12 and JPR 10(1) for articles on problems with risk assessment.)

Pesticide reform activists, however, can use both the pros and cons of testing to promote alternatives. If full testing of "inerts" is required and manufacturers choose not to complete required tests, pesticide products will be removed from the market. If testing is done, we can use the information from the tests about hazards and information about testing inadequacies to accomplish the same objective.



Summary

In the face of our current dysfunctional pesticide regulatory system, activists must recognize that fundamental change in how pesticides are used is unlikely to result primarily from imposing thicker layers of requirements on "inert" ingredients for pesticide product registration. The greatest hope for change is in raising the issue of secret ingredients to force action that will ensure the use of alternatives to pesticides.

In every community, citizens need to challenge spray programs because pesticide users do not know what they are spraying. By proposing non-chemical control methods, citizens offer a better alternative. Ignorance of "inerts" is a powerful tool for promoting alternatives. Use it.

When ingredients are known, citizens can argue for alternatives because of the overwhelming damage to health and the environment that is caused by pesticide use. Citizens need to insist on the right to be free from exposure to *all* the ingredients in a pesticide product unless they have given their informed consent. At every chance, citizens need to press for the consent for exposure to occur in light of information on alternatives.

Finally, a ban on secrets in pesticides can be an important step in shifting EPA's emphasis from permitting pesticides to promoting pest prevention and alternatives to pesticides. Without question, citizens can use the power of pesticide secret ingredients to bring about a demise in their pervasive use. ■

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On the Prowl for Secret Ingredients

By Norma Grier

Does it make sense that a pesticide can contain a secret cancer-causing compound? Does it make sense that the secret ingredient would be identified if it is an "inert" but not if it is a contaminant? That is the case with the herbicide Prowl and its contaminant ethylene dichloride.

Prowl, a dinitro-amino-benzene derivative herbicide with the active ingredient pendimethalin, has an emergency exemption (Section 18) for application on sugar cane in Louisiana. (See JPR 12(1)14-19 for information on Section 18 exemptions.) Some Louisiana residents know the herbicide well. Helen Vinton, a rural specialist with Southern Mutual Help Association (SMHA) in New Iberia, and her colleague were sprayed with Prowl in their agricultural community. Helen told her story at the March 1992 National Coalition Against the Misuse of Pesticides' (NCAMP) Tenth Annual Forum.

This article is about the apparent "inert" in Prowl that was not an "inert." But, the contaminant in Prowl turns out to be a potent catalyst for increased interest in pesticide alternatives among Louisiana sugar cane farmers.

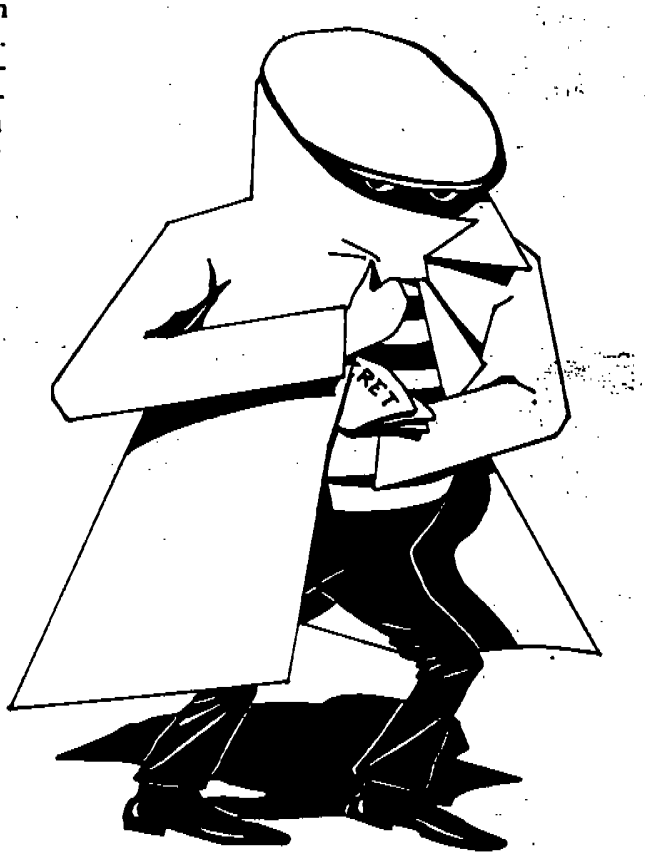
Prowl: Widely Used

Two of the speakers at the NCAMP conference mentioned Prowl in their presentations. In addition to Helen, Rick Hansen of the Minnesota Department of Agriculture mentioned that the greatest number of pesticide containers returned to his agency for recycling was pendimethalin-stained plastics.[1]

In California, a state that requires annual reporting of all agricultural and commercial applications of pesticides, more pendamethalin was used on cotton and for landscape maintenance than any other uses. A total of about 288,000 pounds was used in the state.[2]

In Oregon, pendimethalin use in agriculture ranked 78 out of 199 active ingredients, accounting for 23,000 pounds of active ingredient.[3] The Oregon figure does not include landscape use.

Nationwide, two pendimethalin formulations, Prowl and Scotts Halts, are listed among ten commonly used lawn care chemicals reviewed in a consumer publication on pesticides.[4] Chances are most states have some pendimethalin use.



Robert Coddington

Tracking the "Inerts" in Prowl

Citizens can discover the identity of some "inert" ingredients by looking at publicly-available Material Safety Data Sheets (MSDS). (JPR 11(1):27.) A select group of chemicals that are regulated as "hazardous" or "extremely hazardous" are now required to be listed on a MSDS if they are present in concentrations greater than a tenth of one percent.

For example, the MSDS for Prowl 4E, the formulation used on Louisiana sugar cane, lists the active ingredient, pendimethalin, as well as monochlorobenzene and ethylene dichloride.[5] The MSDS for another formulation, Prowl 60 DG, lists pendimethalin but no other named ingredients.[5] Since the identified ingredients other than the active ingredient are either "inerts" or contaminants, and contaminants would not likely be found only in one formulation, a reasonable person would assume that Prowl 4E has two inert ingredients that are not found in Prowl 60 DG. This is the assumption that NCAP and SMHA made.

Asking EPA to Take Action

On April 23, 1992, NCAP and SMHA jointly wrote a letter to Linda Fisher, Assistant Administrator for Prevention, Pesticides and Toxic Substances, U.S. Environmental Protection Agency (EPA) asking EPA to stop all uses of Prowl 4E because the presence of ethylene dichloride was not disclosed on the formulation label. The letter was copied to the entire Congressional delegations of Louisiana and Oregon, as well as Regional EPA officials in Texas and Washington states. The letter explained the violation of law and included attachments to document our findings.

The label violation was based on EPA's inerts policies that were published in the Federal Register.[6,7] EPA requires registrants (companies holding pesticide registrations) to prominently disclose on the pesticide label the presence of 40 List 1 "inerts of toxicological concern." Ethylene dichloride is a List 1 inert because it

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Norma Grier is NCAP's executive director.

causes cancer in experiments with laboratory animals.[8] EPA prohibited registrants from shipping products that do not properly identify List 1 ingredients on the label after October 20, 1988.[6]

In order to research the label, NCAP contacted the EPA Pesticide Hotline in Texas (1-800-858-7378), asking them to verify whether the label for Prowl 4E included a disclosure for ethylene dichloride. The Hotline confirmed it was missing, but encouraged NCAP to contact the registrant for a current label. The label supplied by American Cyanamid had no listing for ethylene dichloride. A similar label secured at a farm retail outlet in Louisiana showed no such listing. NCAP and SMHA argued to EPA that Prowl was in violation of the law for failure to disclose ethylene dichloride as an "inert."

EPA's Response

As copies of the groups' letter reached elected officials and the media, word came back to SMHA and NCAP that the ethylene dichloride in Prowl 4E was not an inert ingredient.[9,10] Rather, it was a contaminant in Prowl, an unavoidable result of the manufacturing process. Since it was a contaminant, EPA did not consider it subject to the inerts policy. EPA reasoned that contaminants found in active ingredients are routinely evaluated as part of the registration process.[7] So the next step for NCAP and SMHA was to determine how EPA assessed the ethylene dichloride contaminant during registration.

Only 194 of the 611 commonly used active ingredients on the market in 1988 had a registration standard.[11] These 194 compounds are the pesticides that had been reviewed by EPA in order to (a) assess the contaminants and impurities and (b) determine which studies required for registration purposes were missing, inadequate or acceptable.

EPA issued a 1985 pendimethalin registration standard that failed to mention anything about the ethylene dichloride contaminant. EPA did mention the N-nitrosopendimethalin contaminant and required the registrant to analyze for other impurities.[12]

To cover all the bases in case there was more recent information, NCAP wrote a Freedom of Information Act request to EPA on May 6, 1992 asking for all documents and reports concerning the contaminants present in pendimethalin. On May 28 and June 10, NCAP received a partial response from EPA. Additional materials may be released pending clearance from the registrant. The documents now in NCAP's possession contain portions of "blacked out" text, discuss N-nitrosopendimethalin, and refer to three impurities, "Compound A," "Compound B" and "organic residue." Clearly, there is no publicly-reviewable EPA assessment of the hazards posed by the presence of ethylene dichloride as a contaminant in pendimethalin.

NCAP and SMHA are still waiting official response from EPA's Linda Fisher to our request to ban all uses of Prowl 4E. From the public's point of view, it is not reasonable policy to require disclosure of toxic compounds on the label when they are "inert" ingredients while hiding their presence when they are "impurities." At this point, the presence of ethylene dichloride in pendimethalin is no secret. It's disclosed in the MSDS!

Needed Government Action

EPA needs to address the inconsistencies in their policy. Using the Prowl example, it's clear that the separation of "inerts" and "contaminants" is artificial and irresponsible. Public health is not protected by a policy that assumes the registration of active ingredients will necessarily address the hazards posed by contaminants and impurities. The EPA record illustrates a worthless policy.

The Occupational Safety and Health Administration (OSHA), the federal agency responsible for ensuring accuracy of MSDSs, needs to reprimand American Cyanamid. Since ethylene dichloride is an impurity in pendimethalin, it needs to be listed on all MSDSs for pendimethalin formulations.

Community-level Opportunities

When this Prowl story hit the media in New Iberia, Louisiana, it was yet another strike against public trust in pesticides. Like farmers everywhere, Louisiana farmers are facing mounting troubles with pesticide use. (See JPR 11(3):35 regarding major fish kills due to pesticides used on sugar cane.)

In light of this controversy, grower interest in alternative agriculture swells. Bridges are being built between groups like SMHA and farmers who want to use innovative ways to diminish or eliminate their dependence on pesticides. The community-level work of groups like SMHA and local growers is certain to benefit the environment. The work will likely result in showcasing another example of successful pesticide use reduction.

With high use on home landscapes, pendimethalin offers ample opportunities for educating an even wider audience about pesticide problems and alternative solutions. Community members can find out where Prowl or other pendimethalin products are used locally. Then a group can hold a public forum including a panel of speakers to address the problems and solutions for this pesticide's use.

Citizens can have a large effect by publicizing problems with pesticide "active ingredients," "inerts" and "impurities." Linking those efforts with specific goals for pest prevention and alternatives to the use of pesticides, citizens can continue to make a difference in many communities. ■

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ATT. 5

Crime pays again for the Pacific Lumber Co.

By Jesse Noell

Pacific Lumber Company—who has violated the Forest Practice Act more than 250 times in the last 3 years, has been convicted, put on probation, and then violated the terms of their probation—is receiving hundreds of thousands of taxpayer dollars to repair erosion problems they created. In a recent case they were to receive public funds to fix road problems in Freshwater Creek.

Pacific Lumber was convicted this year on charges they violated the law in their road building and logging activities resulting in severe erosion in many of the local creeks and rivers. In some cases their poor logging habits resulted in the destruction of entire fisheries such as has been exemplified in Bear Creek and the North Fork of the Elk.

PL was denied a Timber Operator License in the beginning of this year for "...failure or refusal...to comply with the rules of the board and the provisions of the Forest Practice Act."

PL promised to amend its ways in order to receive a new Timber Operators License. Found guilty months later of further violations, PL representatives assured the court that they would commit no further violations.

As recently as July 1998, PL was cited for three more misdemeanor violations and is now, once again, spending the District Attorney's funds in court to defend themselves against charges that they have further damaged the North Fork of the Elk River. PL has plead not guilty.

A pre-trial hearing on those charges is scheduled for September 24th at 2pm in Court Room #7. Activists are hoping a large contingent of citizens will attend to show the court and the county that PL's behavior is unacceptable.

In addition, Pacific Lumber has refused to comply with provisions of the Cleanup and Abatement and Order #97-115, which was issued by the North Coast Water Quality Control Board to provide downstream residents with domestic water and to protect residents from flooding resulting from PL's recent logging activities.

Hillslope failures from PL's logging and roads have filled in the Elk River with as much as 8 feet of odoriferous mud, thereby greatly increasing potential flooding risks by decreasing the channel's capacity to carry water.

CDF stated on February 11, 1998 "five watersheds of concern in which The Pacific Lumber Company is a major landowner, namely Bear Creek, Jordan Creek, Stitz Creek, Elk River and Freshwater Creek, are all experiencing varying states of impacts..."

Yet after all the damage caused by PL's repeated violations of the law, PL is being rewarded for the damage they caused with tens of thousands of dollars from taxpayers' pockets to mitigate that damage.

There are important questions here. Why is it the taxpayers' responsibility to foot the bill for the crime spree of a billionaire? Why must we pay for restoration of our ecosystems disrupted, ecosystems rendered uninhabitable by species they are required to protect?

Ralph Kraus, resident of the Elk River watershed, poses the question in a more diplomatic fashion: "Should taxpayers' money be used to repair the damage created by a consistent, flagrant violator of the Forest Practice Rules? This is a violator who has been convicted and placed on probation and who refuses to comply with the Abatement Order to provide Elk River residents with domestic water."